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Contractors and Engineers Monthly

Vol. 48, No. 11 NOVEMBER, 1951 $4 a Year, 50 Cents a Copy

THE JOHN CRERAR LIBRARY NOV 20 1951

Covering the Field

• Income-Tax Blues?
There are legitimate ways to cut your income taxes, you know. Check some of them—your car, dependents, insurance, renting trading-in, etc.—on page 3.

• Snow and Ice Economy
Mobilization for defense goes on—but the enemy is snow, on page 5. Read how states plan their winter campaigns to get the most out of their dollars.

• Irrigation Canal
It's in Arizona, and 75,000 acres waited a long time for that water. The story on page 12 tells how a contractor coped with heavy excavation and pairing.

• Turnpike Paving
Four hot-mix plants do their stuff in a race against time on part of the 118-mile New Jersey Turnpike. Page 20.

• Building Construction
Prestressed cement-storage silos are in the news again. The Oro Grande, Calif., plant has eight. Page 28.

Wilmington, Del., boasts a new 7-story office building. The article on page 70 covers excavation, concrete-foundation, and steel-erection work.

• Concrete Boulevard
Widening and extending a boulevard in St. Louis, Mo., posed many problems—especially finishing of the air-entrained concrete. Turn to page 33.

• Philpott Dam
Aggregate production and concrete placing by cableway for this multipurpose structure in Virginia are covered on page 38. Pictures too.

• Roadside Maintenance
On page 51, a survey of roadside mowing, spraying, and tree-trimming practices across the nation.

• Sewage Plant
A dewatering problem was the worst snag the contractor hit when building a sewage-treatment plant for the City of Olympia, Wash. See what he did, on page

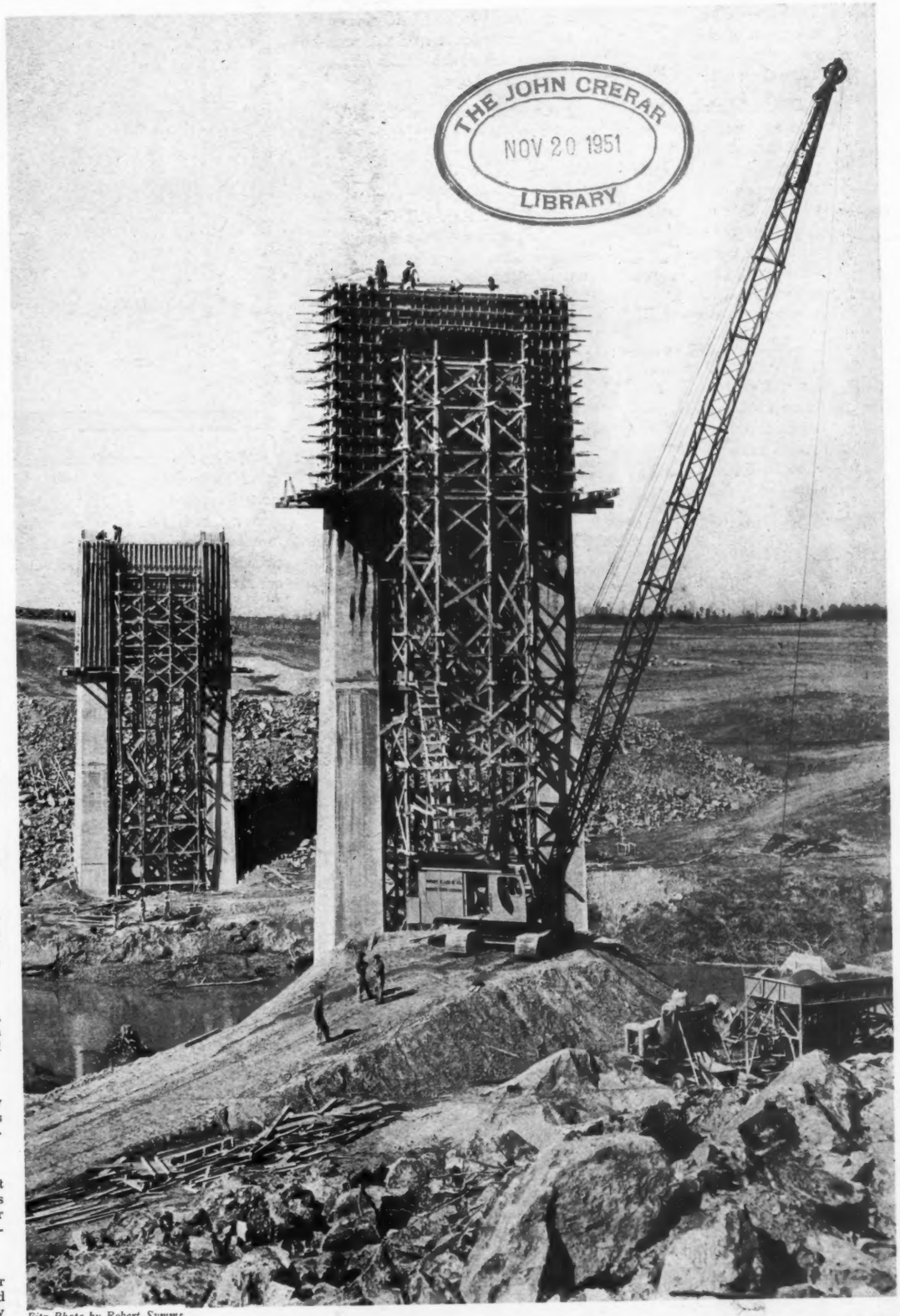
A High Bridge
Little River, Ga., needed quite a bridge, in spite of its name. Rising water in a reservoir meant a bridge with extra-tall . Page 62.

County Road Program
Wyandotte County, Kans., has a county engineer who is an ex-contractor. This combination makes for a go-ahead program. See page 65.

Road Grading
When a big dam is constructed, a lot of incidental work crops up. Page 74 tells how a highway roadbed was raised to clear with water in the Fort Gibson Dam reservoir.

Harbor Dredging
Berthing facilities and a channel for shipping were the objects when Shipyard River, Charleston, S. C., was dredged. Story and pix on page 88.

You will find "In This Issue" on page 4)



Fitz Photo by Robert Symms

The last lift of pier 2 goes in for the new bridge to carry Georgia State Route 47 over Little River near Clark Hill Dam in Georgia. The pier is 134 feet high. The E. H. Hines and E. E. Lee joint-venture contract is covered on page 62.

NEWS AND VIEWS

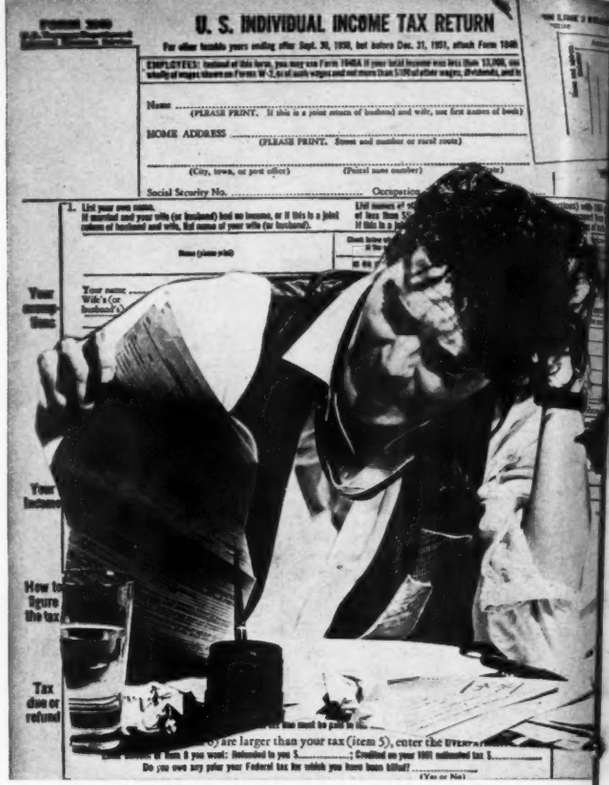
of the construction industry—the road-steel shortage

Recent public hearings on the road-steel shortage cleared the autumn air somewhat, though what else they may have cleared remains to be seen. The occasion was a two-day hearing before the Senate Roads Subcommittee, in response to bags and bags of mail asking that something be done to increase the Defense Production Administration allotment of highway steel.

Bureau of Public Roads Commissioner MacDonald told the senators that only half of the 300,000-ton third-quarter allotment of steel had been delivered. As a result, he said, **576 road jobs have been held up**—389 of them Federal-Air projects. As for the fourth-quarter allotment of only 250,000 tons, the Commissioner said this was by no means adequate, especially since the states could use only 100,000 tons of it to secure structural-steel shapes.

DPA Administrator Fleischmann countered briskly. **Fourth-quarter demand for structural-steel shapes was 223 per cent of the total available,** he said, so naturally the highway request had to be severely cut. Moreover, the BPR's "rock-bottom" estimate of road-steel needs in 1952 was 1,907,000 tons—or about 20 per cent of the total U. S. structural-steel production! . . . As AASHO President Anderson saw it, **Mr. Fleischmann didn't have at all the right attitude.** He tended to look on highway modernization and reconstruction, with some exceptions, as nonessential to highway defense. What was needed, in Mr. Anderson's opinion, was a re-evaluation of highway needs at top government levels.

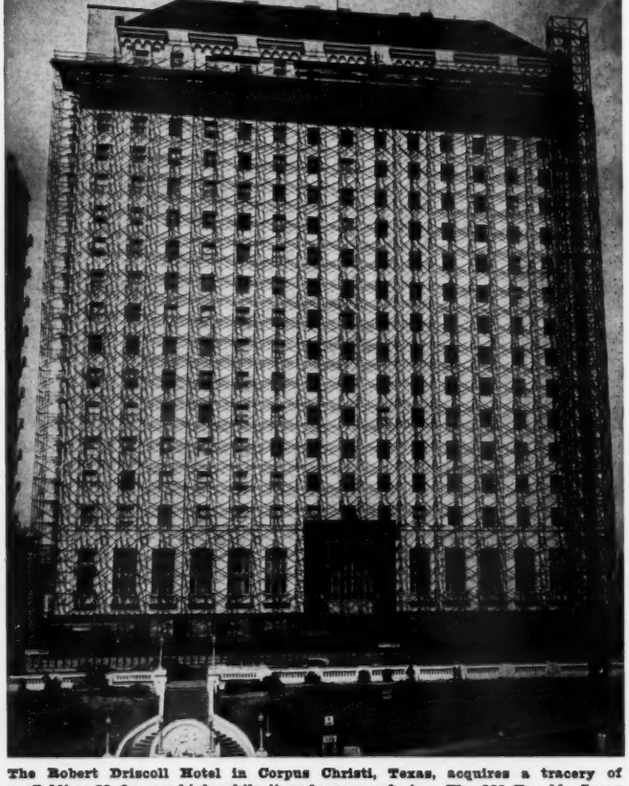
What the Senate Roads Subcommittee needed, decided Chairman Holland (D., Fla.) were extracts of minutes of DPA meetings so it could see for itself what formula gave birth to the 100,000-ton figure for structural steel . . . Perhaps what the Bureau of Public Roads needed was a system for allocating steel to the most vitally needed projects first, in whatever states they are located . . . **And what the DPA undoubtedly needed was a top-level adviser with plenty of background in highway matters.**



Hold everything! Don't despair. There's help on the facing page.

While the subcommittee has no legal power to change the DPA's mind, its hearings may help to change the DPA's emphasis. In any case, Representative T. B. Fugate (D., Va.) later offered for consideration by both houses a **resolution urging the NPA and DPA to "review their procedures"** and to make available, insofar as possible, adequate and "deliverable" quantities of steel for road construction, particularly structural steel.

One other legislative note: The $10 million **access-road fund** provided in the Federal-Aid Highway Act of 1950 has been completely exhausted, and new bills are being deliberated in both houses (H. R. 5258, S. 1956). No final word as this is written, but action should be speedy, since a good many projects are stalled pending the outcome.



The Robert Driscoll Hotel in Corpus Christi, Texas, acquires a tracery of scaffolding 30 frames high while it undergoes refacing. The 900 Trouble Saver frames are based on a special concrete slab and tied into window-cleaner bolts to help keep alignment perfect.

Steel may be king these days, but scrap is crown prince. "Scrappy", symbol of The Advertising Council's campaign to get out scrap, meets, left to right, Campaign Coordinator Mossman, of Jones & Laughlin Steel Corp., Mobilization Director Wilson, DPA Head Fleischmann, and Council President Keppler.

How You Can Lower Your 1951 Income Tax

Are You Tax-Wise About Your Car, Dependents, Insurance Payments, Owning Vs. Renting, Selling Vs. Trading In?

By BETTY LEE GOUGH,
Accounting Consultant

•MANY years ago, Benjamin Franklin wrote what has become a famous and oft-paraphrased remark: that nothing can be said to be certain except death and taxes. Taxes of the income variety—while certain enough—can often be reduced in legitimate ways. For instance:

Sale or Trade-In?

The manner in which new equipment is purchased can make a vast difference in a contractor's income tax. Take the case of Jones, who owned a fork lift which was old and beginning to give trouble. It had originally cost him $2,200 and had a depreciated value on the books of $200.

A vendor offered $100 in trade. Instead of taking this offer, Jones ran a classified ad to sell his used fork lift outright. The best offer he got was $90. He took this rather than trade for $100 with the dealer. Thereby, he saved a neat amount on the tax bill.

The difference between the depreciated value of $200 and the selling price of $90 was $110. By taking this loss in the form of an actual sale of the old equipment, Jones was able to claim —and get—a long-term capital loss. But if he had sustained a $100 loss by taking the trade-in offer of $100, he would not have been able to take off a cent. (However, if Jones had been offered *more* than the depreciated figure, he could have taken this in the form of a trade-in and his book gain would not have been taxable—the tax men do not recognize gains or losses that arise from trade-ins on new equipment purchases.)

Renting or Owning?

It's sometimes possible to offset considerable savings by renting things rather than owning them. This is because depreciation rates often allow a negligible write-off every year; but 100 per cent of a rental charge for business purposes may be deducted from income. In many cases, the tax savings make renting very economical.

Take for example Sam Smith, who owned his building, lock, stock, and lot. Under the Federal law, he could not take any depreciation for the land, since land does not decrease in value or wear out with the passing years. His building was carried on a 30-year amortization table.

Then Smith sold his real estate and reserved the right to lease it back. He found that the additional cost involved in renting was more than paid for by the tax advantage of being able to charge off all of his occupancy costs—including the portion that was paid for the land.

In working out arrangements like this, it's a good idea to watch the wording of sell-and-rent-it-back agreements. In general, courts seem to have sustained these agreements as within the law, provided (1) they don't stipulate that the seller can (or must) buy the property back at the end of the rental period; (2) the buyer and seller aren't closely related—this arouses suspicions of a mere tax dodge; (3) the sale price is in line with the actual market value at the time; and (4) the sum charged for rental is also in line with fair present prices.

More than land and buildings can, under the right circumstances, be rented rather than owned, with enough tax advantage to show a profit over ownership. Sometimes equipment must be depreciated over so many years that the amount of the depreciation comes to little or nothing. Since tax collectors are human, they tend to take the "green book" tables which are sent out by the Treasury as rigid, enforceable figures rather than average recommendations. As a result, some contractors say they have found themselves depreciating equipment on the books long after its actual useful life was over. That trouble doesn't arise when the equipment is rented.

Giving—the Right Way

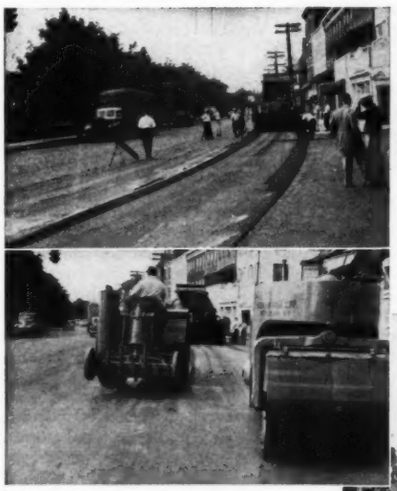
It is common knowledge that charity contributions are deductible. But *how* you give something can make a difference in the income tax bill.

Unless he has unusually high personal deductible expenses, a contractor is better off in most cases using the tax table on the back of Form 1040 (if his income is $5,000 or under) or the blanket deduction of 10 per cent or $1,000, whichever is less (if his income is over

(*Continued on page 83*)

Where paving meets one of its severest tests . .

Boston Post Road



Above photographs show resilient, heavy-duty Texaco Asphaltic Concrete being laid on the Boston Post Road in the Village of Mamaroneck, N. Y. View of the completed pavement at the right. Contractors: Peckham Road Corporation, White Plains, N. Y. and Cold Mix, Inc., Port Chester, N. Y.

Boton Post Road in Old Greenwich, Conn. Also served by Texaco Asphaltic Concrete paving, which was laid in 1948.

Main truck route between New York City and Boston, the Boston Post Road is one of America's most important highways. The pavement constructed on this road must stand up under the heaviest kind of impact day after day, year in and year out.

Resilient, heavy-duty Texaco Asphaltic Concrete, whose rugged durability has been demonstrated on other sections of the Post Road, was used this year on a two-mile section of the route in the village of Mamaroneck, N. Y.

Wherever heavy traffic must be served—principal city streets, truck highways, bridges or vehicular tunnels — heavy-duty Texaco Asphaltic Concrete is a sound choice. Its past performance on the Boston Post Road, the Delaware River Bridge at Philadelphia and many sections of U. S. Route 1, furnish convincing proof of its ability not only to stand up under punishing impact, but to do so at a relatively low annual cost.

Helpful information on Texaco Asphaltic Concrete, as well as other plant-mixed types of asphalt construction, is provided in a booklet entitled, "Texaco Asphalt Paving—Plant-mixed Types." Our nearest office will send you a copy without cost or obligation to you.

THE TEXAS COMPANY, Asphalt Sales Dept., 135 E. 42nd Street, New York 17
Boston 16 (20 Providence St.) • Chicago 4 (332 So. Michigan Ave.) • Houston 1 (720 San Jacinto St.)
Jacksonville 2 (Hildebrandt Bldg.) • Denver 1 (910 - 16th St.) • Philadelphia 2 (1411 Walnut St.)
Richmond 19, Va. (Mutual Assurance Society Bldg.)

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TEXACO ASPHALT

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For the Highway and Heavy-Construction Industry

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Taxpayers' Boulevard

Every highway in the country is really a taxpayers' boulevard, but at long last it appears that a stretch of highway is to be given that specific name. In Massachusetts a member of the State Legislature has proposed that the name "Taxpayers' Boulevard" be given to a piece of new highway near Uxbridge, just north of the Rhode Island line. Highways have been named to honor all types of people, according to the representative, who feels it is about time to recognize officially the taxpayer who after all foots the bills for such roads.

Sounds like a good idea to pass around among the rest of the states. Then when Mr. Taxpayer rides along a wide, smooth, straight, modern highway, he will get the feeling that his gas-tax and license-fee money is being spent wisely to give him a safe artery of travel. On the other hand, if Mr. T. encounters narrow, bumpy, broken pavements, with sharp curves and grades presenting a constant menace to safety, he is going to wonder just what *is* happening to his road-tax dollar, and if it is being spent for highways or something else.

International Accord

Surprisingly enough, a note of international harmony has been heard in Geneva, Switzerland, where a United Nations committee on highway traffic signs has agreed that road markers in these United States are good enough to serve as a basis for a world system of symbols. This decision rather backs up those Ohio motorists who protested last spring at some unfamiliar foreign signs which were erected under a U.N. test along a 12-mile stretch of road near Columbus.

While American symbols for curves, crossroads, intersections, etc., are simple, clear, and generally easy to spot at high speeds, the directional road sign for places leaves much to be desired. Some states still erect these signs with the arrows, names, and mileages parallel to the pavement where they can be read only from a slow-moving horse and buggy. The number system of route marking also has its shortcomings, as when a cluster of route numbers is strung up on a pole for the motorist to scan in one quick glance at a busy intersection.

Here are a couple of tough ones for that U. N. committee to work on. If it comes up with the right answer, the American motorist will be glad to say thank-you in any given number of languages.

The Wrong Answer

Eric Johnston, head of the Economic Stabilization Agency, said last September that he would urge the Administration to impose tighter controls on all types of construction as a necessary part of its fight against inflation. "I don't know whether or not my recommendations will be approved", he said, "but I shall put them forth with all the persuasive force I can." "Tight" controls on home and commercial building, as well as on installment credit, are essential, he said, in any plan to check inflation.

The policy which ESA will urge appears to us to be the wrong answer to the problem. *Real* controls over prices and wages some time ago might have curbed inflation; it still might help. Controls—necessary because of the scarcity of materials for both military and civilian needs—have already severely restricted construction. Tighter controls, presumably for the control of inflation, will only result in unemployment in the construction industry, and particularly in the building trades where controls are likely to be felt worst of all.

Building construction—home, commercial, and industrial—creates real wealth, and is a permanent asset to the nation. Government waste, inefficiency, and more agencies and bureaus to make decisions which would better be left to business itself are neither creative nor a contribution to the national welfare. Where we have nothing to show for the billions we have spent—there is inflation.

Labor's Part

Instead of still fighting the Taft-Hartley Law, and drawing up purge lists of Congressmen who favored it, the American Federation of Labor at its recent annual convention should have been fighting the tighter controls proposed for the construction industry. The Taft-Hartley law has not interfered with labor's right to work. Government controls will. The American Federation of Labor, which includes a large segment of building trades' unions in its membership, is again barking up the wrong tree.

Raw-Material Shortages

Shortages of raw materials have sharply reduced the production of construction machinery, while distributors' inventories of replacement parts for internal-combustion engines are dropping to extremely low levels. These are two of the problems resulting from the controlled-material allotment plan and the system of priority rating.

The Construction Machinery Industry Advisory Committee told the National Production Authority recently that a very high percentage of construction-industry business is defense-rated and nearly all the rest directly related to the mobilization effort. The reduction of 25 to 30 per cent in the fourth-quarter allotment of metals can only result in corresponding reductions in essential defense work. Further difficulties are caused by the fact that the armed services, so far from selling surplus equipment as they did during the immediate postwar years, are now actively procuring it. Some companies are planning to expand their facilities to meet this demand, and in this connection NPA announced that up to July 1 certificates for rapid tax amortization were processed for a total of $100,000,000 worth of plant expansion.

As regards the parts shortage, the Internal Combustion Engine Industry Advisory Committee told NPA that the situation was created by the priority ratings imposed on the purchase of replacement stocks, including complete engines. Dealers would be in an even worse position, were it not that manufacturers are taking extraordinary steps to see that dealer stocks are not allowed to drop too drastically. NPA explained that copper is in particularly short supply. Experimental radiators made of aluminum are now in the test stage, and if certain problems can be solved, the largest single use of copper in an internal-combustion engine may eventually be eliminated.

Highway Finance, 1945-50

According to a statement issued by the U. S. Bureau of Public Roads, total disbursements for highway purposes by all units of government in continental United States exceeded $4 billion for the first time in 1949, and passed this mark again in 1950. The total spent in 1949 is calculated to be $4,182 million and that for 1950 to be $4,582 million. These totals include debt retirement of $260 million in the former year and $312 million in the latter. Total receipts were $4,264 million in 1949 and $4,647 million in 1950. Of these amounts new borrowings accounted for $531 million and $702 million respectively.

The Public Roads statement tabulates estimates of the highway receipts, expenditures, and long-term debt of all units of government in continental United States during the years 1945 to 1950 inclusive, data for all major publicly owned toll facilities being included.

Round Up That Scrap—Now!

When a shortage becomes an emergency, it is time to do something about it. And that is what has happened with steel. For full information on what you can do to save scrap, write to Public Liaison Division, Office of Public Information, National Production Authority, Washington 25, D. C.

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The American Institute of Steel Construction has awarded "firsts" to these three bridges opened to traffic in 1950. Top: Columbia River Bridge at Wenatchee, Wash. Center: Caldwell Avenue Bridge over Edens Expressway in Illinois. Bottom: South

States Stretch Their Snow-Removal Dollar

Better Planning and Preparation, Modern Highway Design, And Radio Are Some of the Biggest Helps

A Bros Model M-9 rotary tackles heavy Wyoming snows near Rawlins.

• WHILE men everywhere mobilize for defense against other men, hundreds of combat teams across the United States are grouped for another but equally primitive kind of defense—against the elements.

Theirs is a less spectacular battle, perhaps, because more routine. But on its success every winter millions of citizens depend for their transportation to and from job, school, and store. And on its success this winter will depend the defense mobilization program itself.

Battle Bigger, Costlier

The battle against snow and ice becomes every year a bigger and costlier effort for highway departments. More and more roads must be kept open as public demand for them increases—not to mention the fact that closed roads mean a loss of badly needed road-user revenue for the highway departments.

Let's look at some figures. Plows now see duty on about 333,000 miles of state highways, or on 56 per cent of the entire mileage under state control. Of the nation's $1.3 billion annual highway maintenance bill, about $110,000,000 now goes for snow and ice control. That's almost 10 per cent. On a composite 1,000 miles, as computed by the Bureau of Public Roads, total yearly maintenance costs were $8,148,216, or $814.82 a mile. Of that sum, $834,691 or $83.47 a mile went for snow and ice control.

Total snow and ice-removal expenditures in 1949 represented an increase of 270 per cent over the 1935 outlay. Increases have been even more extreme in individual cases. A western state experienced in 1930-34 a cost increase of 547 per cent over 1925-29; 1,124 per cent in 1935-39; 1,065 per cent in 1940-44; and 2,516 per cent in 1945-49.

Faced with more roads to keep open, the need for more machine and manpower (both increasingly costly), and revenues critically inadequate, highway departments have had to redouble their efforts to stretch their snow-removal dollars. Better preparing and better planning for the battle against snow and ice have therefore been the primary emphasis.

Preparing, Planning

The routine preparations accredited through the years have persisted, of course—marking drainage structures, curbs, islands, and guardrail so that equipment operators can spot and avoid them; inspecting drainage structures to see that they're working; installing snow fence to control drifts; and so forth.

But a relatively new philosophy of long-range preparation has also come to the fore: the philosophy of making roads take care as much as possible of their own snow removal. That means plantings to prevent drifts. It means more emphasis on autumn cleanup of roadside hedges, brush, and weeds which catch snow and cause drifts. It means, especially, designing and building roads with an eye to low-cost snow removal—avoiding cuts, raising grades, flattening backslopes, rounding slopes top and bottom, widening shoulders, omitting guardrail where possible, leaving plenty of space for snow storage.

Of course, the modern divided highway can create its own peculiar snow-removal problems (for instance, operators learn to shy away from median-strip curbs, so that during snowfalls a 4-lane road may become a 2-lane road to all intents and purposes). But in general, costs of plowing a modern road, with its elevated grade line and streamlined cross section, are considerably below plowing costs for roads with obsolete sections—$19.53 a mile as opposed to $296.56 a mile, in one case studied by the BPR where the sections were similarly located! At that rate, the cost of rebuilding the old section could be amortized in 20 years from snow-removal savings alone. And maintenance men are quick to point out this sort of economy to construction men.

More careful planning of the snow-removal operation itself has been another result of economy-mindedness. Perhaps no other phases of highway maintenance are so responsive to effi-

(Continued on next page)

MACK TRUCKS

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• There are many good reasons why a Mack is your best truck investment during times like the present. Most important of all is the undisputed fact that Mack trucks outlast them all.

This means that with a Mack truck you can face the uncertainties of the future with assurance...confident that even if trucks should become hard to replace your Mack will see you through...that it will stay on the job delivering dependable service mile after mile and year after year.

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In punishing contracting service Mack trucks "see you through" with long-lasting dependable operation. This Model LJ six-wheel Diesel Mack serves D'Addario Contracting Co. of Bridgeport, Conn.

States Stretch Their Snow-Removal Dollar

(Continued from preceding page)

cient organization and advance planning as snow removal and ice treatment. Most highway departments now have detailed operating plans, often visualized on large area maps, of the roads to be cleared, with appropriate priority ratings; the type and amount of equipment assigned to each route; and the names and call numbers of foremen. No small part of efficient planning is the record of last year's operations—its successes and failures—on the basis of which this year's performance can be improved.

As in other types of maintenance, there has been greater interest in local control over equipment, with state-headquarters control limited to emergencies—and in the patrol rather than the gang type of organization. Colorado, for example, finds that its hundred-odd patrol crews have more personal interest in their work since it involves their familiar home ground. They develop a greater sense of responsibility for their average 22-mile patrol sections. And they take more initiative since they need not wait for assignment from above.

Better personnel training has been another result of the stress on preparedness, with preseason training schools for operators and "dry runs" for equipment almost a commonplace. This is likely to grow even more important as shortages of manpower and machinery come to be felt.

Highway departments have long worked closely with weather bureaus to get advance warning of storms and some idea of their probable intensity and duration. Several departments are now turning also to the long-range forecaster to win an even greater margin of time in which to alert their men.

So much for preparation. The snow flakes are starting to descend. It's combat time. Now what?

Equipment

Snow removal these days starts with the early flakes—on the theory that it's easier and cheaper to keep a highway clear than open one that's blocked. As for many years, it begins generally with push plows, goes to V's and wings as the snowfall increases, and continues with heavy rotaries if needed.

A Model YU FWD truck with V-plow, owned by the Shawnee County, Wis., Highway Department, breaks its way through snow.

The BPR estimates that about 30,000 units of snow-removal equipment now see service on the state highway systems—and about the same number of county, township, and municipal systems. Of these, the motor grader is the most popular at the county level, with the truck plow the mainstay on state systems.

Light equipment cannot handle the snows in Colorado, say, where reversible-blade plows on 4-wheel-drive 3 to 6-ton trucks do most of the work, with rotaries in the mountain passes. (At McCook, Nebr., in 1948-49, they tried tractors with plows to help push plows and V's with heavy dirt-laden snows.) But where snows are lighter and road sections are streamlined, there's a trend toward more light, fast equipment. In New Hampshire, for instance, 75 per cent of the trucks used for plowing are 1½, 2, and 2½-tonners. Even Minnesota has very few heavy trucks and rotaries, most of her snow fighters being trucks, tractors, and motor graders with appropriate attachments.

Everywhere, west and east, there is more emphasis on the use of year-round maintenance equipment with snow-removal attachments, rather than costly purchases of heavy-duty specialized snow machines. Even states in the whitest part of the snow belt are saving themselves the purchase of many heavy-duty units by moving those they have around more—dispatching them several hundred miles to critical areas.

(Continued on next page)

No. 10 Snatch Block, 6" to 10" sheave . . . 94 to 98 thousand lbs. ultimate capacity.

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Austin Western

SINCE 1859—BUILDERS OF CONSTRUCTION EQUIPMENT

A Baker reversible trip-blade plow on a Mack truck does its stuff.

A Frink V-plow with a leveling wing "widens out" after a first cut in light snow.

Seldom in states that cover so much territory is there trouble everywhere at once.

The biggest single aid in this dispatching is radio—the big recent innovation in snow-removal equipment.

Radio

In 1950, over 60 state, county, and municipal highway departments were using radio regularly. Chautauqua County, N. Y., for instance, sends out light, fast, radio-equipped plows to cover the roads. These units handle what they can, skirting the drifts and radioing their location back to the dispatcher, who sends out a heavy unit to do the bucking.

Chautauqua brings to mind one of the main advantages of radio. The County had to get along with one-third less equipment than usual in 1942-43 because of the Army demand for machines. But it was still able to keep all its roads open—thanks to radio. Onondaga County in New York can combat many storms with less than half the mobile equipment formerly used—thanks to radio. One maintenance engineer has told us he can do 20 per cent more work with the same equipment—with the help of radio.

The saving in equipment and manpower, though particularly important now, is not radio's only advantage. It saves time, a priceless commodity in snow removal. If a piece of equipment breaks down, another can be dispatched by radio to take its place, while the repair shop can also be alerted by radio to get the crippled unit back into operation fast.

Radio frees supervisors from their desks. It increases the morale of equipment operators, who know that help, if they are stranded in drifts or must rescue motorists, is no farther away than the microphone on the dashboard. It is tremendously effective as a tool of good public relations, since it enables highway departments to give information to schools, bus lines, and the general public, which is learning to rely more and more on such reports. In case of atomic warfare, it would also be indispensable to the Army Transportation Corps and civil-defense teams as a supplement to their own communications.

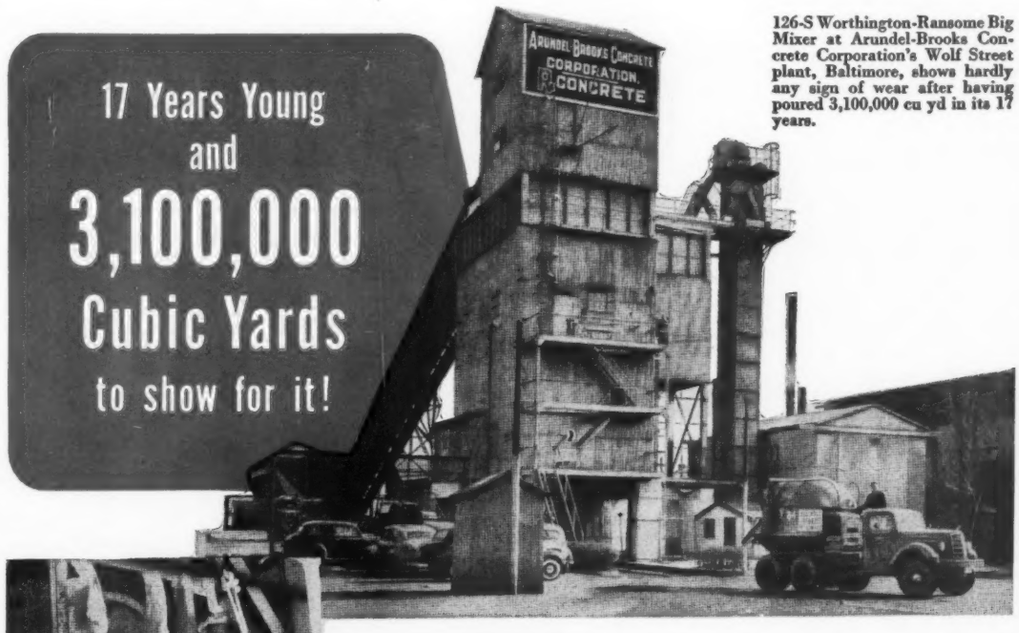
Ice Control

Ice is as much of an enemy as snow, and enters just as much into highway department calculations—particularly in mild winters when roads thaw and freeze quickly.

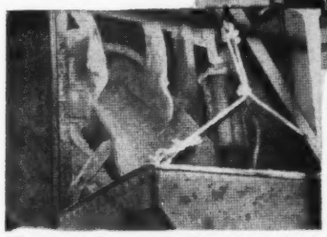
Here, too, the problem is growing bigger and costlier. Two examples will suffice—that of Maine, which used 3,000 tons of salt in 1945-6 and 10,000 tons in 1948-9, and that of Montana, whose sanding costs were $78,629 in 1945-46 as compared with $265,365 in 1950-1.

Here, too, preparation is half the battle. Departments must establish a priority schedule for ice treatment, based on the importance of routes, their traffic volume, their danger spots, and so forth. They must familiarize supervisors and crews with this schedule. They must ready equipment for service—the trusty dump truck with its trailer, tailgate, or hopper-type mechanical spreader. They must obtain abrasives well in advance of the season, giving thought to the type to be used, how it is to be stored, and how it is to be treated to keep it from freezing in storage or blowing off the road.

(*Continued on next page*)



126-S Worthington-Ransome Big Mixer at Arundel-Brooks Concrete Corporation's Wolf Street plant, Baltimore, shows hardly any sign of wear after having poured 3,100,000 cu yd in its 17 years.



Worthington-Ransome 126-S discharging full 5 cu yd batch in approximately 30 seconds.

One of Arundel-Brooks' 6½ cu yd agitators pouring a retaining wall at General Sam Smith Park, being built to relieve traffic congestion at Light and Pratt Streets, Baltimore.

In 1950—its 17th year—this veteran concrete mixer poured more than 250,000 cu yds on a single set of liners!

This extraordinary performance of a 126-S Worthington-Ransome Blue Brute concrete mixer is attested to by Arundel-Brooks' records. The machine, given proper maintenance over its lifetime, shows virtually no wear after uncounted hours of profitable service.

Arundel-Brooks operates two other Worthington-Ransome Big Mixers—an 84-S at the Sparrow's Point plant, a 56-S at Brooklyn, Md.

And eight of the company's growing fleet of truck-mounted agitators are Worthington-Ransome Blue Brute Hi-Ups, considered "highly satisfactory in every respect."

These eight are used for most long-distance hauls because their light weight* permits carrying a maximum payload with strict adherence to highway load limits.

FIND OUT WHY THERE'S MORE WORTH IN WORTHINGTON

See your nearby Worthington-Ransome distributor. Worthington Pump and Machinery Corporation, Construction Equipment Sales Division, Dunellen, N. J.

**7,290 lb for the standard 4½ cu yd truck mixer, as little as 6,700 lb for 6½ cu yd agitator models.*

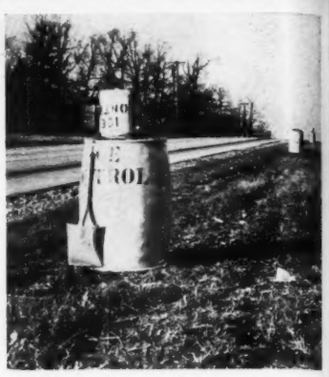
WORTHINGTON

BUY BLUE BRUTES

You'll find you, too, can get the real *performance plus* from Worthington and Worthington-Ransome Blue Brutes—a broad line of construction equipment noted for the rugged quality your type of work demands.

Abrasives treated with calcium chloride go down on a road in N. Y. State's Onondaga County.

Hillside storage bins for abrasives speed loading and lower ice-control costs.



Motorists can get at these abrasives, if necessary, before regular maintenance forces arrive.

States Stretch Their Snow-Removal Dollar

(*Continued from preceding page*)

The abrasives most commonly used nowadays are sand. cinders, or washed stone screenings. Tests have indicated that cinders are best because they are sharp and cut into the ice, because they provide better traction for tires, and because, being dark, they absorb more heat from the sun and are more clearly visible and more reassuring to the motorist. Washed stone or slag screenings from which the fines have been removed are good, too, because hard and angular. Sand is satisfactory provided it is clean, hard, sharp, and free from loam, clay, or frozen lumps.

Bins located to serve more than one road, and with two levels—one for loading and one for discharge—are generally conceded to be the best means of storing abrasives because they permit the fastest and most economical loading. Some tests made during the winter of 1945-46 and reported by the Calcium Chloride Association showed an average loading time for 6-ton trucks of 2½ minutes from bottom-gate bins—as compared with 32 minutes for hand loading with 2-man crews. Bin-loading costs versus hand-loading costs were 9 cents versus $1.20 per truck.

Sheds provide the next-best storage protection (they can also be used for equipment in the summer), and covered stockpiles the next-best. The covering is important. As much as 60 to 70 per cent of a calcium-chloride treatment can be lost in two months where stockpiles are not covered. At that rate, it would be far more economical to buy covering material—tarpaper, Sisalcraft paper, corrugated metal, or wood covers—for 25 to 50 cents per cubic yard of abrasives, though actually such covering may cost only 10 cents per cubic yard.

Often departments store small quantities of abrasives in wooden boxes or steel drums, along hazardous stretches of road—for emergency use by the public before maintenance forces can get to the spot.

Whatever abrasives are used and however stored, they should be mixed with dry calcium or sodium chloride, or with chloride brine sprays, to keep them from freezing and from whipping off

(*Concluded on next page*)

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unbeatable for STRENGTH!

1 it withstands punctures, road shocks and cuts.
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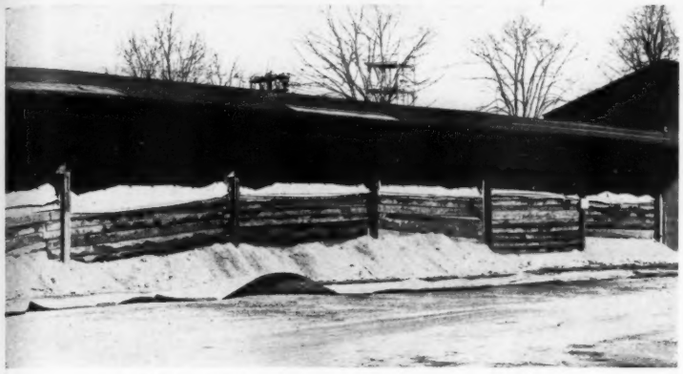
3 it prevents spinning action, cause of cuts on muddy terrain.
4 it can be used without speed limitation.

the MICHELIN "METALIC" Y Tire

MICHELIN TIRE CORPORATION, 341 East 62 nd St, NEW-YORK 21. NY



Rock salt is stored outdoors in open sheds at Hartford, Conn.

the road. Mixing methods are many and varied, depending somewhat on equipment available. It is best to treat abrasives at central mixing stations where quantities and the mixing operation can be carefully controlled—but in any case, the more thorough the mixing and the coating of each particle, the more economical and efficient the job of ice control.

In their search for economy, many states are turning to the use of dry chlorides alone, without abrasives. The Ice Removal Bureau cites comparative cost studies made by F. Ray Williams, Superintendent of Highways in Saratoga County, N. Y., who found that it cost almost 50 per cent less to use straight rock salt—$7.59 a mile for sand treated with sodium chloride, $3.32 a mile for the straight rock salt.

According to the Bureau, rock salt spread at the beginning of a storm helps to melt the fall and keep it from freezing; if the snow has already compacted and frozen, the rock-salt crystals bore down through the frozen mass so traffic or plows can easily remove it. Moreover, according to the Bureau, many communities are learning that they can store rock salt outdoors all winter with no protection from the weather.

Calcium chloride, too, may be applied without abrasives. The Calcium Chloride Association recommends about ½ pound of flake calcium chloride per square yard, spread uniformly—or, on thin ice and snow, a strip treatment at the center line of bituminous pavements (not concrete pavements). Temperatures should be on the rise and traffic volumes should be large if strip treatment is to be effective.

Chlorides alone, and chloride-treated abrasives, are used sparingly on portland-cement concrete, since the repeated freezings and thawings may be conducive to surface pitting and scaling of concrete in contact with these salts. Unscaled pavements over 4 years old are less susceptible to damage, and those that have been given protective surface treatment or are made from air-entrained concrete are generally free from damage.

Finally, economy-minded departments concentrate more every year on the speed of their ice treatment—speed of loading, speed of hauling, and speed of applying abrasives. That means spotting loading points strategically and mechanizing loading and spreading wherever possible. It means a constant competing with their own records of the years before, to make ice control speedier, more effective—and hence more economical.

This year, again, many a combat crew and the department behind it is out to better its own past records of snow and ice control.

Toy Transit Works Like the Real Thing

Here's a chance to give some juvenile would-be surveyor a working scale-model transit. Sold by The Toy Center, 193 Harvard St., Brookline 46, Mass., the new Surveyor Junior is simple to assemble and operate. Inexpensively priced, it includes a complete scale-model transit, scope base, legs, uprights, rod, and plomb bob. The instruction booklet suggests many easy projects such as how to survey a back yard or farm lot, or lay out a baseball diamond or horseshoe court. Short histories of famous surveyors are also included in the handbook.

It's a toy, but it works when Junior wants to lay out a baseball diamond or survey his backyard. The Toy Center, Brookline, Mass., makes it.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 904.

The
BACHTOLD MOWER
with attachments
does more jobs

It SAWS. Big 20" saw blade can be used in either horizontal or vertical position. Powerful, fast.

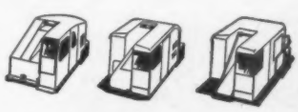
It MOWS right up to bushes, trees, buildings, etc., cutting a 28" swath evenly. Adjustable runner. It CULTIVATES almost any kind of soil.

●Easy starting ●Finger-tip control ●Portable ●Compact ●Fully guaranteed ●Push-type and self-propelled-type models

BACHTOLD BROTHERS, INC. Forrest, Illinois

LORAINS offer SELECTION UNLIMITED

TURNTABLES
6 series — ½ to 2-yard classes, crane capacities up to 45 tons.



CRAWLERS
standard, extra long for draglines, extra wide for trenching.

RUBBER-TIRE MOUNTINGS
1 or 2-engine types, 2 or 3 axles, 4 or 6-wheel drive.

BOOMS
shovel, crane, dragline, clamshell or hoe — all interchangeable.

Want a shovel-crane "tailor-made" to fit your job? Lorain *selection unlimited* is the answer. Select the Lorain turntable "series" to fit your production needs. If it's a crawler job, select from standard, extra long or wide gauge types for best results. If mobility is a must, select from single or 2-engine rubber-tire carriers, in a wide assortment of axle and drive arrangements. Then fit the front end with shovel, crane, clamshell, dragline or hoe to handle any materials . . . and you're in business with the best shovel-crane money can buy! There's more *selection* in the complete Lorain line!

HOW YOUR THEW-LORAIN DISTRIBUTOR CAN HELP

Ask your local Thew-Lorain Distributor to analyze your job . . . and recommend the *best* shovel-crane for your exact needs. He knows local job characteristics. He will show you Lorains at work on nearby contracts. He will give you complete specifications, performance, price and delivery data. He backs your job with time and money-saving parts and mechanical service. And with *"selection unlimited"*, he's your best bet for every shovel-crane need!

THE THEW SHOVEL CO.
LORAIN, OHIO

This Lorain was "tailor-made" for drainage ditch excavation in soft, soupy going. The owner selected a ¾ yd. Lorain-TL25K dragline with extra long 12 ft. 6 in. crawler for good flotation, reduced ground pressure and to eliminate "nosing-in." Approximately 1100 yards of drainage ditch was handled in a 10-hour day.

THEW LORAIN®

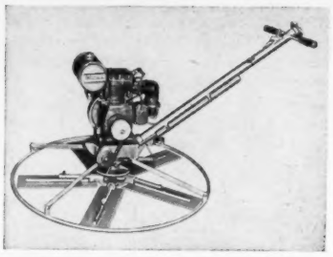
SELECTION UNLIMITED AT YOUR THEW LORAIN DISTRIBUTOR

Floating, Finishing By Five-Trowel Unit

The Model C concrete floating and finishing machine announced by Whiteman Mfg. Co., 3249 Casitas Ave., Los Angeles 39, Calif., has five rotating trowels that can be used for both floating and finishing by an adjustment of the pitch. This feature eliminates changing trowels. An adjustment on the trowel arms allows perfect alignment of trowels at all times, the company states.

Trowel pitch can be changed while the machine is in motion by turning a knob on the end of the shaft. A new stationary guard ring encircling the machine permits finishing within 1½ inches of walls, columns, etc.

The machine's 6-hp 4-cycle gasoline engine makes it suitable for heavy slabs. A new double-groove clutch with two belts increases trowel speed. Whiteman points out that with the trowels adjusted for floating, the Model C compacts the slab, drives out air pockets, brings up moisture, and produces a good surface where traction is desired. Adjusted for finishing, it produces a smooth, level surface.



Whiteman Model C concrete floating and finishing machine has 5 rotating trowels of a new universal type.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 878.

Black & Decker Promotes

John F. Spaulding has been appointed Sales Manager of The Black & Decker Mfg. Co., Towson, Md. He joined the company in 1926 and, since 1931, has been Manager of the Buffalo, N.Y., branch. In his new capacity Mr. Spaulding will supervise the sale of the firm's portable electric tools to distributors in the United States and Canada.

This Koehring hoe increases the Model 304 excavator's digging depth to 19 feet 9 inches.

New Hoe Attachment For ¾-Yard Excavator

A hoe attachment that will increase the Model 304 excavator's digging depth to 19 feet 9 inches has been developed by Koehring Co., 3026 W. Concordia Ave., Milwaukee 16, Wis. The dipper arm is pivoted at the end of the boom and jacknifes to dig a vertical backwall. This is said to reduce handcleanup time in basement digging.

The position of the countershaft in line with the boom foot mounting eliminates dipper drift when the boom is raised, and double digging lines to the dipper eliminate reverse cable bends, Koehring says. Adjusting links on the dipper arm allow three variable settings so that the dipper angle can be matched to the type of material and cut being made. There are no moving cables or sheaves on the dipper. Because the digging line is coupled close to the dipper through an equalizer, the dipper can be pulled up tight to the boom for increased production efficiency.

Other improvements on the Model 304 provide resistance to side sway and extra strength to meet operating conditions for below-ground-level excavating.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 922.

Crushing, Screening Plants

A 12-page illustrated booklet on Continuflo crushing and screening plants with exclusive bottom-deck feed has been prepared by Pioneer Engineering Works, 1515 Central Ave., Minneapolis, Minn. The bottom-deck feed is designed to eliminate much of the stopping and starting due to frequent screen changes; it permits continuous adjustment of the balance between the roll jaw and the crusher jaw while the plant is in operation.

Cross-section photo-drawings illustrate the feed, showing how the top and bottom decks work independently, to double the effective screening area. Specifications are given for 7 Pioneer plants, plus detailed data on their component parts.

This literature may be obtained from the company by requesting Form 586A, or by using the Request Card at page 16. Circle No. 941.

Industrial-Type Compressors

A 12-page catalog about air compressors for use in equipment garages or repair shops is offered by Quincy Compressor Co., 217 Maine St., Quincy, Ill. It includes illustrations and specifications of the 35 air-cooled Quincy compressors, which are available in types and sizes ranging from 1 to 90 cfm.

This literature may be obtained from the company by requesting Form 300, or by using the Request Card at page 16. Circle No. 924.

The Symbol of Roller Chain Quality—the Diamond

TRADE ◇ MARK

● The "Diamond" mark is more than a means of ready identification of Diamond Roller Chain. It is a symbol of unvarying quality of the product and the integrity of the maker.

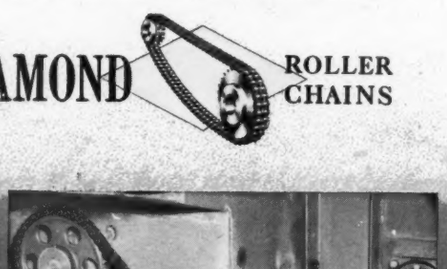
DIAMOND CHAIN COMPANY, Inc.

Dept. 487, 402 Kentucky Avenue, Indianapolis 7, Indiana

Offices and Distributors in All Principal Cities

Refer to the classified section of your local telephone directory under the heading CHAINS or CHAINS-ROLLER

DIAMOND ROLLER CHAINS



LEFT: Diamond Roller Chain from engine on Power Shovel.
ABOVE: Chains driving Hopper belts on Road Paver.
RIGHT: Diamond Chains on Trenching Machine.

Onan's 3DSP-1E diesel-electric plant generates a 115-volt 60-cycle single-phase current.

Diesel-Electric Plant

A 3,000-watt air-cooled diesel-electric plant is manufactured by D. W. Onan & Sons Inc., 4855 University Ave., Minneapolis 5, Minn. The Model 3DSP-1E has push-switch control for electric cranking, a manual compression release, and an electrically heated glow-plug for cold-weather starting.

The plant is driven by an improved 4-cycle single-cylinder Onan DSP diesel engine. It consumes approximately 0.155 gallon of furnace oil per kilowatt hour at full rated load and generates a 115-volt 60-cycle single-phase current. Other ac models available in single-phase produce 230 volts and 115/230 volts. A 32-volt battery-charging model can also be supplied. All models are conservatively rated to provide ample overload protection, the company says.

Further information may be secured from the company by requesting Form A286. Or use the Request Card at page 16. Circle No. 944.

Melts Ice and Snow

A new type of ice and snow-melting chemical pellet is announced by The Chem Industrial Co., 1114 Hippodrome Bldg., Cleveland 14, Ohio. It is called Melt and is applied by sprinkling sparingly over ice or snow surfaces. A handful under rear car wheels is said to provide traction and stop wheel spinning.

Melt is available in 25-pound metal pails and 100-pound fiber drums. It is also offered in ton lots, packed in 100-pound moistureproof paper bags.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 953.

Dredges and Machinery

A catalog that is almost a handbook on dredges and dredging machinery has been prepared by Ellicott Machine Corp., 1611 Bush St., Baltimore 30, Md. It contains illustrated descriptions of types of dredges in use today and a detailed account of their applications. It compares the features of dipper, grapple, ladder, self-propelled, plain-suction, and cutterhead dredges. Photographs show the company's dredges performing work in land filling, real-estate development, sediment removal, channel maintenance, canal digging, land reclamation, and river and harbor control work.

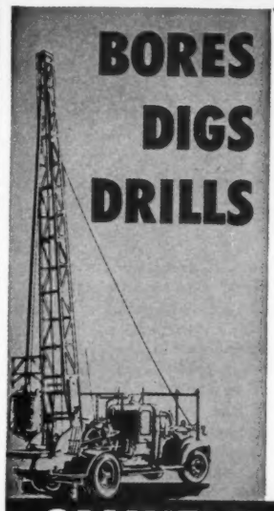
A section is devoted to the production of sand, gravel, and shell for the materials-producing industries. Another section gives a brief history of the 65-year-old company and describes its plant. Still another outlines the engineering services and machinery available from the company. It points out that Ellicott dredges are built in all sizes and capacities, with rated outputs of 75 to 2,000 cubic yards per hour or more.

The booklet illustrates dredges ranging from an 8-inch portable to giant steam or diesel-powered 30-inch dredges. It outlines methods for selecting equipment, discussing such topics as use, operating and pipeline conditions, required output, character of the material, methods of delivery, and possible future use of the dredge.

This literature may be obtained from the company by requesting Catalog No. 825, or by using the Request Card at page 16. Circle No. 918.

Timken Executive Killed

John P. Roberts, Assistant General Manager of the Service Sales Division of The Timken Roller Bearing Co., Canton, Ohio, was killed in an automobile accident on September 19. P. T. Ancarrow, Atlanta Division Manager, and W. L. Walthall, a salesman with the company, were seriously injured in the same accident, which occurred when the men were calling on accounts in the Atlanta territory. Mr. Roberts had been with Timken since 1935.



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CAISSON PIER HOLES
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WATER WELLS, CESS POOLS

FOR MINERAL EXPLORATION
FOR SOIL TESTING

BORE 10 TO 84-INCH HOLES AS DEEP AS 200 FEET with a Calweld Earth Drill. Interchangeable bucket-type drills speed up the boring of any type of soil, quickly removing earth with each pass. Each operation is mechanically performed. All controls are centered in a single unit for convenient one-man operation. Built on a skid frame for mounting on trucks. Write for bulletin.

California Welding & Blacksmith Shop, Inc.
7222 E. Slauson Ave., Los Angeles 22, California
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CALWELD EARTH DRILLS

This 144-page book shows over 5,500 on-the-job truck running cost reports . . . from owners in every state in the U.S.A.

Here's *another* Ford first! New "Final Results" record, based on over 5,500 running cost reports, lets you check what truck running costs can be in over 195 different jobs!

50 million mile Economy Run shows HOW LITTLE IT COSTS to run a FORD TRUCK in your kind of work!

● The purpose of the Economy Run was to give businessmen and truck operators dependable truck running cost figures, based on actual trucks working on actual jobs. These figures are published so that you can:

SEE before you buy, just how little it *does* cost to run Ford Trucks.

SEE what size trucks cost the least to run in various kinds of work.

SEE how your running costs compare with others in your kind of work.

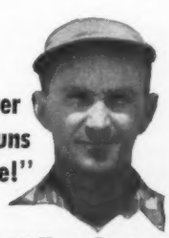
Are all running cost figures included? Yes! The "Final Results" book shows all gas, oil, maintenance and repair costs reported by users of 1948, 1949 and 1950 model Ford Trucks.

Can this book help YOU? Yes! It is a service to businessmen which may save you real money. It gives you a standard of comparison on one of the big expense items in your business.

What does the book show? The Economy Run book shows that in your kind of business, even the biggest Ford Trucks haul for only a few pennies a mile, and that *all Ford Trucks cost downright little to run.* See the book at your Ford Dealer's today!

ROY GEETING,
Construction Man,
Eaton, Ohio, says:

"My Ford hauls over 6 tons of gravel—runs for only 3 1/10¢ a mile!"



Mr. Geeting was one of over 250 Heavy Construction Men, shown on pages 43 to 46, who took part in the Run. His Ford F-6 Dump traveled 21,003 miles at a cost of $639.83 for gas, oil, maintenance and repairs. Check *your* truck running costs with those of other heavy construction men whose loads and working conditions are similar to yours!

For the right truck for your job . . .
See your Ford Dealer today!
See "Ford Festival" starring James Melton on NBC-TV.

Contractor Hurries Reclamation Canal

Canal Size Changes and Heavy Excavation Do Not Delay 30-Mile Irrigation Project

• WATER:—75,000 thirsty acres of the Wellton-Mohawk Division of the Gila Irrigation Project, near Yuma, Ariz., have waited long for that magic word. Now the time is near when water is practically in sight. One more short 10-mile contract will see it through.

Coming to a finish this year is a 30-mile section of the Mohawk Canal, being built for the U. S. Bureau of Reclamation by Western Contracting Corp. of Sioux City, Iowa. The project includes excavation, production of concrete aggregates, concrete lining, structures, protective dikes, and riprap. The contractor is not only ahead of schedule, but also found time to line 10 miles of a previous canal contract under construction by another contractor. By December 31 of this year, Western's officials expect to have completed the 30-mile job, even though the contract has until 1952 to go.

For canal lining, some exceptional performance has been recorded. The lining crew, on a 12-foot bottom section, lined 2½ miles of canal in a week. One day saw 2,640 linear feet placed on a 12-foot bottom. Excavation production one March day touched a peak of 37,500 cubic yards.

Two Bottom Widths

In the 30-mile job are two principal sections, starting with a 12-foot bottom width, then changing to a 10-foot bottom as the canal winds its way up the Gila valley. Depths range from 10 to 14 feet. Sideslopes are 1¼:1, and the concrete lining, which is designed to make future maintenance costs as low as possible and to prevent excessive water seepage, is 3 inches thick throughout the job. Except in special sections in transitions near structures, it consists of unreinforced concrete.

The canal passes up the valley along the south boundary of the irrigation division. The desert is almost virgin. The sandy, silty soil is covered with sparse desert growth. Until the water comes in by way of the new canal, valley life is at a virtual standstill, and the desert shimmers in blistering heat. It is, in fact, one of the hottest sections in the United States.

Excavation

The excavation comprises about 6,300,000 cubic yards of easy-digging sand. For the most part the only real excavation trouble is the powdery, fine desert material, which runs out of a dragline bucket like cement. An operator can pick up a full bucketload, but by the time he swings over to the spoil pile about 25 per cent has dribbled out.

The main canal prism is being excavated by two high-capacity draglines: an 8½-yard Marion 7200, which Western Contracting Corp. owns, and a rented 200-W Bucyrus Monighan dragline. It, too, is an 8½-yard rig.

Rounding out the excavation equipment is a Marion 111-M dragline, capacity 5 yards, a 2½-yard Bucyrus-Erie 54-B, and a Northwest Model 95. There is a great deal of structural excavation, and the smaller rigs are handy for that. The 111-M usually works on main canal excavation.

But all of the canal is not in cuts. Part way it must be built up from the desert floor, suspended in compacted embankments which form its sides. This earthwork was subbed to Bressi-Bevanda Constructors, Inc., of Los Angeles, along with miscellaneous earth-moving connected with dikes and other protective embankments.

Bressi-Bevanda is using a tractor-scraper fleet, consisting of five 22-yard LeTourneau Carryalls with D8 loading and pushing power. Water for compaction is secured at various points throughout the valley, where pioneer farmers once drilled wells. Sheepsfoot rollers compact the soil to a high degree of density, and the built-up sections are left just slightly full. On the cut sections, the draglines leave the sides and bottom a foot high.

C. & E. M. Photo

The canal trimmer on the Wellton-Mohawk job had to be cut down twice to fit the narrow sections. Here it moves down the canal ahead of the slip-form liner and paver.

Maintenance of excavation equipment has been somewhat of a problem, because haul roads for mobile service equipment are often hard to maintain. There is a central equipment repair shop on the job, but all routine service is delivered to the field by mobile units, since the equipment cannot easily leave the places where it is working.

The mechanical force has one trick that is worthy of note. Welders have

(Continued on next page)

"AT HUNGRY HORSE ONLY HANDLED ALL OUR

BUILDING HUNGRY HORSE DAM, Hungry Horse, Montana: Equipment used included 24 Diesel-powered Euclids, each of which has logged a quarter-million miles on this assignment; 9 Caterpillar tractors; 5 Northwest shovels; 27 International Harvester trucks; 8 Reo 55-passenger buses—plus numerous Chicago Pneumatic and Gardner-Denver air compressors and Chicago Pneumatic rock drills, as well as 2 Lidgerwood Cableways and 2 Washington Cableways.

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discovered a method of hard-facing shovel teeth which is faster, wears longer, and uses less welding rod than was formerly the case when straight cross-beads were run. This method consists of running a longitudinal bead up both bottom edges of the tooth, and another straight bead up the center portion. Then the interstices are criss-crossed by hard-facing beads of the same rod, which is either Ranite B or Abrasoweld. The uncovered parts of the tooth never wear; apparently the diagonal beads slow down the sand velocity and prevent wear.

Trimming and Lining

Canal trimming and lining follow conventional methods, with railroad rails set along both sides of the top berm, a mechanical trimmer removing excess excavation, and a slip-form liner following up to place the concrete.

The trimmer, which has been cut down twice to fit the narrowed canal sections, consists of a heavy frame, two endless bucket chains driven by Caterpillar diesels, and electric-powered drive wheels. Power is supplied from a Caterpillar diesel-electric set.

Excess dirt pulled up by the trimmer is deposited on the canal bank, and a D8 tractor and dozer working with this machine smooths off the material to leave a road for the paver and batch trucks. Two 2,500-gallon water tank trucks haul constantly from nearby wells, and their operators spray water around and behind the trimmer to make the naturally unstable banks more firm for concrete. Every so often the bucket line hits a rock, and there is a hole in the canal bank. Such damage is repaired by hand by a 2-man crew behind the trimmer.

C. & E. M. Photo

A close-up of the slip-form liner in action on the Wellton-Mohawk Division of the Gila Irrigation Project. Canal sides and bottom were placed in a single pass. Syntron vibrators consolidated the concrete.

The slip-form liner consists of a similar frame, with a central gob hopper for concrete, a small traveling concrete-distribution machine, and large chutes which carry the material down to the point of placement. Syntron vibrators on the slipform consolidate the concrete, and the effect is exactly as if the liner were squeezing a ribbon of concrete, like toothpaste, out of a tube. Canal sides and bottom are placed in the single-pass operation.

Behind the slipform there is a finishing jumbo, where cement finishers and laborers work. Transverse contraction joints are cut by a hand-operated beater device which forms about 12 inches of the joint at a time. These joints are on 12-foot centers. Longitudinal contraction or expansion joints are also made, one at each edge of the canal bottom, and the other halfway up each slope. They are cut in by knives which drag from the slip-form frame.

A curing jumbo is the final machine in the lineup. Three men apply curing solution to the fresh concrete surface, and a black mastic substance goes in the joints. Curing is subcontracted to Lyons & Lyons of Fresno, Calif.

The concrete is mixed at the site by a Koehring 34-E Twinbatch paver, which discharges mixed concrete by conveyor to the slip-form gob hopper. Mixing water is hauled in by two 2,500-gallon tankers, which transfer the water to four 1,000-gallon water tanks on the slip-form frame. Centrifugal pumps, powered by electric motors, take the water from the tankers and send it to storage. Part of the water from the liner tanks is used to spray the sand banks ahead of the machine. The rest passes through a flexible hose, carried on the conveyor frame, to the paver.

The batching and aggregate plants are the same shop-assembled facilities which Western Contracting Corp. used on its Delta-Mendota canal work in California. (See C. & E. M., July, 1950, pg. 61.) The aggregate production plant takes pit-run material, removes about 55 per cent of unusable fines and oversize, screens and washes the remainder, and delivers sand and one size of aggregate to the trucks, which haul it to the batch plant. At the batch plant, the aggregate is passed through a rescreen tower and separated into the three different bin sizes required by the USBR.

The batching facilities consist of three separated plants. As trucks drive through, they pick up aggregate from the first of these setups. Then they drive over to a 700-barrel cement silo, located along a spur line from the Southern Pacific Railroad, and pick up their cement. A final stop is made at the sand-batching plant, and the trucks are then on their way to the lining crew.

Equipment Moves Are Difficult

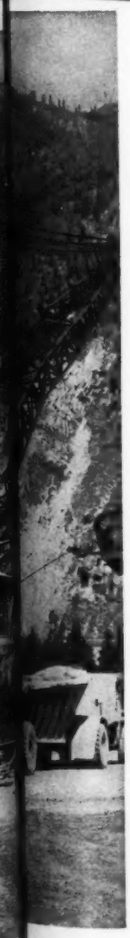
Field men seem unimpressed by their

(*Continued on next page*)

6 TEXACO PRODUCTS MAJOR LUBRICATION"

General-Shea-Morrison Company, Contractor, Hungry Horse Dam, Hungry Horse, Montana, says—

"The time and confusion saved by the Texaco Simplified Lubrication Plan are incalculable."



"Not only is it more economical to use a small number of lubricants," says General-Shea-Morrison Company, "but there is little chance of error in application. The Texaco Lubricants used at Hungry Horse Dam were a big factor in keeping our equipment on the job and our maintenance costs low."

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3. Wheel Bearing Lubrication: Use *Texaco Marfak Heavy Duty*. It seals out dirt and moisture, seals itself in — assuring longer bearing life, safer braking. No seasonal change required.

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Follow the Texaco Simplified Lubrication Plan for greater savings and convenience on every job. A Texaco Lubrication Engineer will gladly help you set it up to meet your particular conditions. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

Lubricants and Fuels

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Contractor Hurries Reclamation Canal

(Continued from preceding page)

ability to sustain, day after day, over 2,000 feet of lining. The one thing which they regard as difficult has been the moving of some of the 170-ton lining and trimming rigs. It used to be that they had to dismantle the machines, move them to the next section, and reassemble them. That was stopped several years ago when contractors on California irrigation canals began to move the heavy slipforms and trimmers in one piece. But it is still a task which causes superintendents and foremen to sweat blood, because such machines are tremendously top-heavy. If one ever turned turtle while it was being moved, a contractor could kiss his profits goodby for that project.

On the 10-mile subcontract, there were two moves around pump lifts, one over a siphon, and one around a railroad tunnel. A railroad and highway had to be crossed on Western's main contract. They had changed depth on the subcontract job 8 times; when they reached their own job they had to change depth 4 times and cut the machines down twice.

On long moves, the machines are lightened by taking off the power plants, hoppers, and such heavy items as might make the machines dangerously top-heavy. Four cranes then pick up the machine with 4-part lines, walk it forward, and set it on a trailer which will carry it to its next location. The trailer is equipped with heavy steel outriggers which slide along the ground and help to keep the load level. Two D8's pull the trailer after the machine is loaded. The unloading and resetting process is, of course, the reverse of the original.

For the lift over the siphon, the four machines made the lift direct, and walked the canal machines ahead to the next placing point.

All the lifts were made without the slightest mishap, and the lining machine is now on the home stretch. Bids were recently taken by the Bureau of Reclamation on the next 10-mile section.

The Gila Project: Background

The Gila Project, where reclamation is transforming raw desert into thriving farms and welding them to an already established agriculture, has two main divisions. The Yuma Mesa, just east of Yuma, comprises about 40,000 irrigable acres. The Wellton-Mohawk Division, comprising approximately 75,000 irrigable acres, begins some 15 miles east of Yuma and extends up both sides of Gila River for about 40 miles. Although most of the division lies in the river valley, some bordering lands are also included.

The story of the Gila Project ranges over many years. On the Yuma Mesa Division, new land is being brought into cultivation for the first time.

Agricultural history of the Wellton-Mohawk begins with the Pima Indians, who were irrigating the Gila River bottom lands in the early 1500's. Settlement by white men began about the middle of the 19th century, when the celebrated Butterfield stage line penetrated the area. By 1875, a number of homestead filings had been made. Several thousand acres were brought under irrigation during the 1890's with brush dams and other headworks con-

(Concluded on next page)

Photo Courtesy of Western Contracting Corp.

Moving top-heavy trimming machines is a headache for superintendents and foremen. Western Contracting Corp. moves this one across U. S. 80 on the Gila Project.

Atlas

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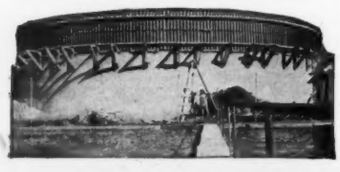

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The Moto-Patcher delivers up to 10 tons per hour of *freshly* mixed material. The aggregate may either be shoveled into the hopper, or fed into the hopper by a small elevator (optional equipment). The mixed material is deposited on a pan of convenient height for easy shoveling, or it can be dropped directly onto the road surface. The 400 gal. bitumen tank assures an adequate supply of bitumen for uninterrupted production, making frequent stops unnecessary. The mixer, running through the bitumen tank, provides a drying action for the aggregate. If desirable, bitumen may be circulated when the machine is not mixing.

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Bulletin MP-51, giving specifications, flow diagram and complete information will be sent on request.

structed to divert the Gila water to thirsty soils.

But Wellton-Mohawk agriculture was not without its tribulations. Disastrous floods swept down the stream, and for 25 years they washed out crops and destroyed the diversion works. Following the floods, there were long periods of drought, and the river was reduced to a trickle.

In 1915 several wells were drilled by settlers who felt that ground-water sources would, in the long run, provide cheaper and more reliable irrigation than diversions from the river. More and more wells were installed until approximately 11,000 acres were under cultivation in 1931.

Increased diversions for irrigation upstream have progressively decreased flows in the Gila, so in normal years there is seldom any surface flow through the Wellton-Mohawk area. Construction of Coolidge Dam upstream in 1928 and of dams along the Salt and Verde Rivers has reduced the flood flows available for recharging and sweetening the underground water supply. By 1934, excessive salt had appeared in many wells, and the water table had gone down to an alarming extent. One after another, the farms had to be abandoned. There was a brief resurgence of agriculture in 1941-43, after a history-making flood, but even that died again.

Study after study was made, and the only feasible solution depended on the successful introduction of Colorado River water to the salt-encrusted land. The work by Western Contracting Corp. is a part of that scheme, which will consist of three major canals with appurtenant structures, laterals, three main pumping plants to lift the water, and two smaller pumping plants. The Wellton-Mohawk Canal, 18½ miles long, leaves the Gila Gravity Main Canal just below the Gila River Siphon and about 15 miles below Imperial Dam. Its branches, the Mohawk and Wellton Canals, will convey the water to their respective lateral systems. First water should flow through the system early in 1952.

ARBA Appoints Petty

At a meeting of the Board of Directors of the American Road Builders' Association in Washington, D. C., on September 14, President Paul B. Reinhold appointed Ben H. Petty as President of the Educational Division. Mr. Petty, Professor of Highway Engineering at Purdue University, succeeds Professor A. Diefendorf, who has held the presidency of this division for a number of years.

The decision to appoint a new division president is in line with a resolution taken by the Board of Directors at its Milwaukee meeting, limiting the term of office of the President of ARBA and the president of any division within ARBA to not more than two consecutive terms.

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Palo Alto California

Photo Courtesy of Western Contracting Corp.

The liner too is tricky to move. Western takes it across a siphon, after reducing the weight by removal of power plant, concrete hopper, etc.

Packaged Electric Power

A 24-page bulletin on packaged electric power is available from the General Electric Co., One River Road, Schenectady 5, N. Y. It outlines methods of obtaining electric power equipment for quick expansion at low cost and with a minimum of critical materials.

The catalog contains photographs and diagrams and shows how to plan, order, and install the packaged power. With their standardized components, the package units eliminate the need for individually engineered electrical systems. Each package is a complete factory-assembled unit designed for a specific job and ready for operation when delivered, the bulletin says.

The catalog also lists 31 other G-E bulletins on equipment available for industrial power expansion.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 886.

"Let the shovel go . . . but hang on to that DIPPER"

When the preference for an Amsco Dipper is so strong that a superintendent at one of Minnesota's largest iron mines quietly removes it from a shovel being shipped to another mine, there are apt to be some good performance reasons why!

The superintendent reported that this AMSCO 6½ yard renewable lip dipper *loaded a record number of tons per 8 hour shift*—more than had ever been loaded before. And, where other dippers needed repairs every 2 months or so, it is still going strong after 6 months of service with no repairs of any kind!

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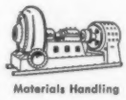

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Airco's Wilson MCM 200-amp transformer welder is a rugged unit for general maintenance and production welding.

Transformer Welder

A new 200-amp transformer welder for general maintenance and production welding is announced by Air Reduction, 60 E. 42nd St., New York 17, N. Y. It is a rugged unit with simple controls, built for service in garages, job shops, and plants.

The MCM has a full 200-amp, 50 per cent duty cycle, NEMA rating. Four variations are available: 220-volt or a 220/440/550-volt unit, each with or without power factor correction.

Two open-circuit voltages are provided—80 volts on the low range and 55 volts on the high range. Airco says this combines easy arc starting with a lower kva demand load and primary ampere current. Insulation throughout, an easy-to-read current indicator, and absence of moving parts are other features of the machine.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 992.

HRB Proceedings Issued

The proceedings of the Thirtieth Annual Meeting of the Highway Research Board, held at Washington, D.C., on January 9-12, 1951, have been published in book form by the National Research Council. The editors were the late Roy W. Crum, Director of the Board; Fred Burggraf, now Acting Director, and W. N. Carey, Jr., Executive Assistant.

The book is a report of some of the speeches made at the meeting, and the papers given by the members are complete with diagrams and photographs. Subjects covered in specific department meetings include economics, finance, and administration; design; materials and construction; maintenance; traffic and operations; and soils. There is also a listing of the papers presented at the meeting, which are to be published by the Board in bulletin and separate form.

The proceedings are available from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington, D. C. The prirce is $7.50.

Plywood Is a Defense Need

Defense needs will probably absorb at least 35 per cent of production during the months ahead, O. Harry Schrader, Jr., announced last September. Mr. Schrader is Managing Director of the Douglas Fir Plywood Association, Tacoma, Wash.

Speaking for the 70-factory Douglas-fir-plywood industry of Washington, Oregon, and California, Mr. Schrader, who had received a National Production Authority forecast of plywood wants, said that defense directives issued to military agencies emphasized that wood and plywood were important as an alternate to steel and other metals in short supply, and the greatest possible use should be made of both indoor and outdoor (waterproof) plywood and the various commercial grades and thicknesses within the two types. As military buying agencies were temporarily out of funds due to Congressional delay in passing the new appropriations bill, Mr. Schrader expected that buying for defense would be heavy during the last three months of 1951.

Prestressed-Concrete Bridges

A brochure on prestressed-concrete bridges is offered by Freyssinet Co., Inc., 57 Williams St., New York, N.Y. It indicates briefly the principle of prestressed concrete, why it is used, and the basic systems. More detailed data are given on the Freyssinet methods and their applications. Typical cross sections of bridges and photographs of construction are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 939.

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Above—Hydraulic HT4 TRAXCAVATOR *grading a street in Minneapolis, Minnesota.*

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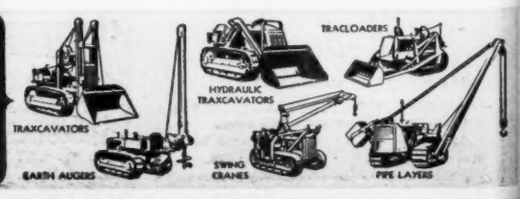

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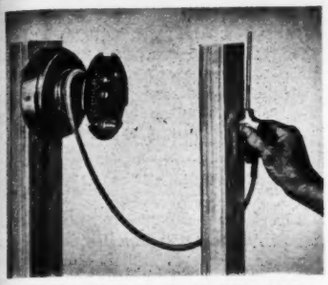


The Hydrolevel for the building trades is based on the principle that a liquid rises to the level of its source. It can be used to extend a level line around or over obstructions.

New Hydraulic Level For Building Trades

There is a new application of the old principle that liquid seeks its own level. An instrument developed by Hydrolevel, 87 De Soto Ave., Ocean Springs, Miss., establishes level lines with an accuracy based on a hydrostatic principle rather than on mechanical adjustments. The Hydrolevel offers speed, accuracy, and economy to carpenters, masons, plumbers, shorers, and other trades in the construction fields, the manufacturer says. It is constructed principally of aluminum and plastic. There are no delicate parts with sensitive adjustments, and hence no special precautions are required in handling or transporting the instrument, the maker says.

The operating principle is quite simple. The Hydrolevel, a development of the simple water level, is based on the principle that a liquid rises to the level of its source. By hanging or placing the combined reel and reservoir of the instrument in any convenient vertical or horizontal surface, a liquid level is established. When the gage line is matched with this level, all inscribed marks are related to the same liquid level and therefore level with each other. A transparent material is used in the gage and line so that the operator can see at a glance that enough liquid is in the reservoir.

The company points out that with this unit you can extend a level line around or over obstructions and it may be used in difficult locations regardless of vibrations. It has a long enough tube to establish level marks on an average job in one setup. By repeated setups, a level line can be extended indefinitely. It is impractical to establish a level line to some definite elevation. However, one can establish a level line where convenient, and with this as a base measure up or down to the required elevation or grade. The entire unit is contained in a convenient and compact carrying case.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 860.

Research on Diesels

A research report on lightweight high-speed diesels by Cummins Engine Co., Inc., Columbus, Ind., was highlighted in a paper presented by N. M. Reiners, Manager of the Cummins Research Laboratory, during the summer meeting of the Society of Automotive Engineers at French Lick, Ind.

Reiners described an experimental 6-cylinder 401-cubic-inch diesel engine which develops 345 hp turning at 4,000 rpm. He emphasized that the engine is purely an experimental model and is not now intended for production. However, he said the experiments demonstrated that the present diesel engine, though highly developed, has not reached its ultimate limit.

Detailed Data on Renting Interlocking Sheet Piling

An 8-page brochure outlines the features of steel-sheet-piling rental and gives complete engineering details of interlocking sections. Prepared by L. B. Foster Co., P. O. Box 1647, Pittsburgh 30, Pa., it provides specifications on piling sections, corners, and connections made by three leading manufacturers. The data include sizes, weights, and section numbers.

Foster points out that all lengths and sections of standard interlocking sheet piling are available for immediate rental. Delivery is made from five strategically located warehouses and from many field stock points.

The brochure highlights the economies of lightweight, corrugated, steel sheet piling. It also describes power hammers and power extractors available through Foster. On-the-job photographs show piling in use on six large jobs with unusual problems.

This literature may be obtained from the company by requesting Bulletin No. F-160, or by using the Request Card at page 16. Circle No. 900.

Frederic E. Everett Dies

Frederic E. Everett, retired New Hampshire State Highway Commissioner, died suddenly on September 18 in Boston, Mass., at the age of 75.

Mr. Everett was New Hampshire's first State Highway Commissioner and was appointed in 1915. He served in that capacity for 35 years, only stepping aside in 1949, after which he became special consultant to his successor, Frank D. Merrill. During his long association with the State Highway Department — begun in 1906 — New Hampshire's highway system grew from the wagon trails that served the pioneers to the 3,700 miles of modern highways existing today. Mr. Everett was a charter member of the New Hampshire Society of Engineers.

NEW

Whiteman

MODEL "C"

FLOATING AND FINISHING MACHINE

Model C is the latest and greatest in the outstanding line of Whiteman Floating & Finishing Machines that have proved their high efficiency, superior performance and rugged durability to contractors of all sizes the world over. It incorporates numerous important new features developed over the many years since Whiteman pioneered the finishing machine.

FLOATING: With the trowels adjusted for floating, it quickly compacts the slab, drives out air pockets, brings up moisture and produces an excellent surface ready for finishing.

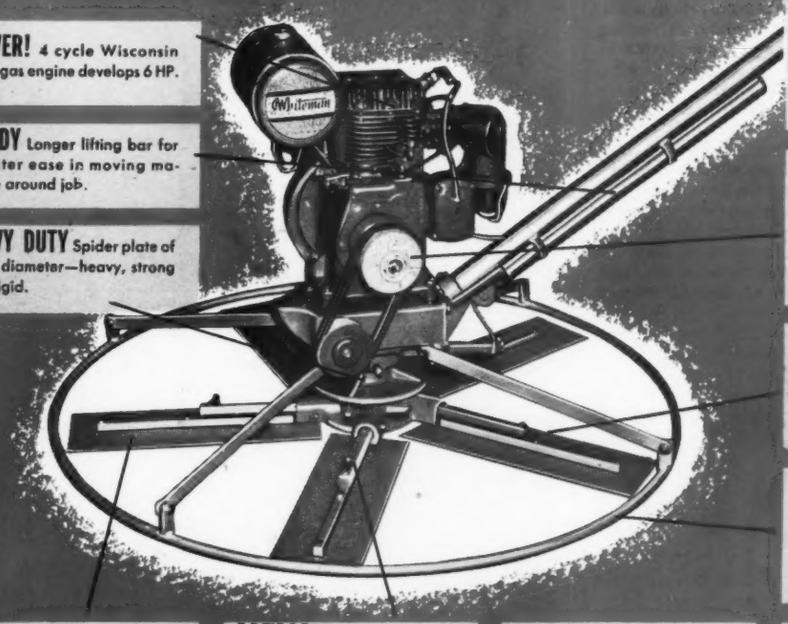
FINISHING: The same trowels are used for finishing, simply by adjusting the pitch with the control knob at top of the handle while the machine is in motion. It produces an extremely smooth, level surface. Especially suitable for heavy duty slabs. Send coupon below for details now.

Greater than ever

POWER! 4 cycle Wisconsin AKN gas engine develops 6 HP.

HANDY Longer lifting bar for greater ease in moving machine around job.

HEAVY DUTY Spider plate of small diameter—heavy, strong and rigid.



NEW HANDLE
Wider handle with comfortable rubber grips gives easier control of machine at all times.

NEW CLUTCH
Double groove clutch transmits more horsepower through two belts. Improved clutch pulley ratio INCREASES TROWEL SPEED 25%.

NEW-5 TROWELS
5 trowels with 10° lead give smoother operation.

NEW GUARD RING
Stationary guard ring permits machine finishing within 1½" of walls, columns, etc.

NEW UNIVERSAL TROWELS
Tool steel trowels can be used for both floating and finishing, eliminating trowel change.

NEW ARM ADJUSTMENT
Individual adjustment on each trowel arm allows perfect alignment of trowels at all times, insuring full 44" surface contact.

CONTROL! Trowel pitch can be adjusted while machine is in motion, a patented exclusive Whiteman feature.

NEW WEIGHT
20% increase in weight helps speed all jobs — especially adapted to patent method and heavy duty floors.

Whiteman
CONCRETE EQUIPMENT

WHITEMAN MANUFACTURING CO.
3249 Casitas Ave. Dept. C, Los Angeles 39, Calif.
Please send me literature and prices on Whiteman Model C Floating-Finishing Machine and name of nearest distributor.
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Vulcan Tools
Rock Drills, Pavement Breakers and Clay Diggers.
Vulcan Tool Manufacturing Co.
35-42 Liberty Street, Quincy 69, Mass.
Branch Offices and Warehouse Stock.
74 Murray St. 34 No. Clinton St.
New York 7, N. Y. Chicago 6, Ill.
Send for catalog or see your local distributor.

Experimental Pile Is Able to Re-Use Steel Reinforcement

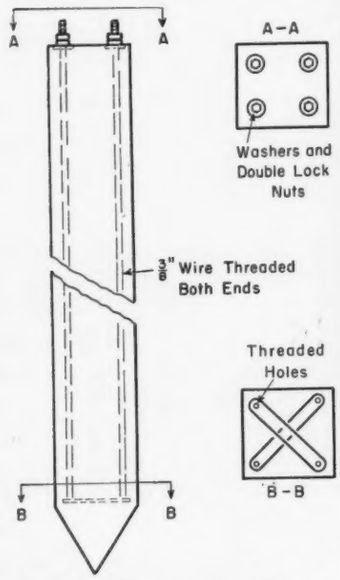
An appreciable saving in steel reinforcement is nothing new to the men who have worked with prestressed concrete—including the producers of precast piles. But K. P. Billner, President of Vacuum Concrete Inc., has come up with a new twist. His pile, now in the experimental stage, permits multiple re-use of the steel reinforcement.

The piles, he told those attending The First U. S. Conference on Prestressed Concrete at M. I. T., can be made up in various shapes and sizes, in lengths up to 100 feet. One such pile has already been made for experimental purposes in South America.

The method of fabricating these piles is as follows: Forms are set up for the necessary cross section. The reinforcement consists of four or more ⅜-inch-diameter wires held at the ends by cross-frames. The entire unit is placed in the form prior to concrete pouring. Each wire is coated or encased in a paper sleeve to prevent bonding. The wires are said to have the same reinforcing value as that of ordinary ⅞-inch reinforcing bars. They have a yield point of approximately 175,000 psi and can be stressed up to 120,000 psi. They are threaded into an anchorage at the bottom of the pile and through a washer and double-nut arrangement at the top.

After the reinforcement is in place the concrete is poured and allowed to harden. When the concrete has sufficient strength the pile is prestressed, electrically. As Mr. Billner explained it, this can be done in the field or plant Electric leads are connected to a pair of diagonally opposite wires, outside the double nuts. A current of low voltage and high amperage is then applied by means of an electric welder. Most welders meet the requirements of approximately 600 amperes at 40 volts, he said. The electric current, passing down one wire, across the frame at the bottom, and up the other wire, induces heat in the wires, causing them to lengthen. When they have extended themselves the required amount (this will depend upon the prestress desired and the length of the pile) the current is disconnected and the double nuts run up against the washer. As the wires cool they tend to contract, but are prevented from doing so since they are now fixed at both ends of the pile. This inward pull of the wires puts them in tension (the concrete in compression) and thereby prestresses the pile. The method is repeated for the other wires in the pile. Each operation takes about a minute, Mr. Billner said.

When the pile is completely prestressed it may be handled and driven in the usual manner—and with less worry about cracking, since it is prestressed and is under constant compression. After the pile is in place and is laterally supported by the earth, the reinforcing wires may be withdrawn, according to Mr. Billner. The electric current is applied to the wires, extending them and loosening the nuts at the top. The nuts are then tightened against each other, thereby locking them to the wires. A wrench can be used on the nuts to unscrew the wires from the bottom cross-frame. The wires can then be pulled out and re-used. The ultimate in steel savings —no?



This electrically prestressed pile developed experimentally by Karl P. Billner permits multiple re-use of the steel reinforcement and can be made in lengths up to 100 feet.

Conference Proceedings

The proceedings of the Twelfth Annual Highway Engineering Conference held at the University of Utah on April 2-4, 1951, are reported in Bulletin No. 52 of the Utah Engineering Experiment Station, Department of Civil Engineering. The bulletin, illustrated by photographs and diagrams, contains papers by members on a variety of subjects including mix designs and their cost; selection of material and equipment in road building; highway loading; reports on highways in five different states; airport engineering and the importance of flight strips; American highway experience reflected abroad; and national and state highway programs at home.

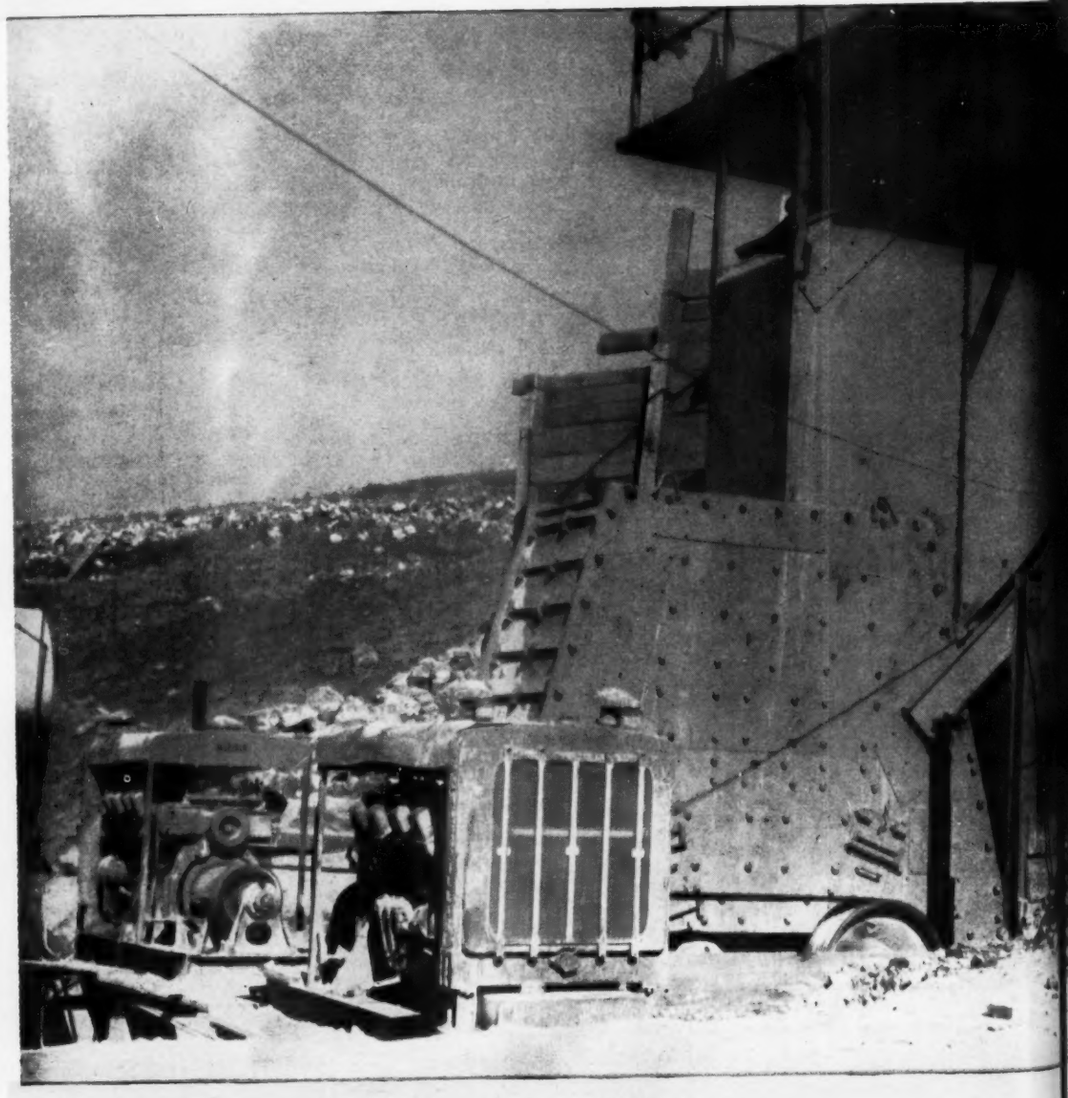
Bulletin No. 52 may be obtained from the University of Utah, Salt Lake City, Utah. Its price is 50 cents.

Power-Takeoff Literature

Literature on power takeoffs is available from Chelsea Products, Inc., Chelsea, Mich. It covers single-speed spur-gear, helical-gear, and universal takeoffs, and heavy-duty and reversible dual units. Specifications are complete and there is an illustration of each.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 910.

CONSTRUCTION



THE IOWA LINE *of Material Handling Equipment Includes:* ROCK AND GRAVEL CRUSHE
BELT CONVEYORS • STEEL BINS • VIBRATOR AND REVOLVING SCREENS • UNITIZED ROCK AND GRAVEL PL
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HAMMERMILLS • WASHING PLANTS • VIBRATING SOIL COMPACTION UNITS • DOUBLE IMPELLER IMPACT BREA

New NBS Strain Gage Set in Wet Concrete

A waterproof internal-strain gage, developed by Rudolph C. Valore, Jr., of the National Bureau of Standards, provides a simple method for determining internal strain, thermal expansion, or drying shrinkage in hardened concrete. It can be embedded in concrete during fabrication of a test specimen or structural member, and is a modification of the commercially available SR-4 bonded-wire resistance-strain gage.

The metal-encased gage is inserted in the fresh concrete. The strain from the hardened concrete is transferred to the gage by the bond of the cement-water paste in the concrete to the metal foil. Calibration is not required because the gage constant, as determined by the manufacturer of the gage element, is the same for the waterproof gage.

The gage has performed satisfactorily in stress-strain determinations made upon cylindrical concrete specimens in compression, in measurements of drying shrinkage of concrete prisms dried for 100 days, and in the measurement of linear thermal expansion. Dial-gage length comparators and Tuckerman optical-lever strain gages have been used for evaluating the performance of the internal gages.

Work is now under way to evaluate the stability of the internal gages over longer periods and to compare the performance of the gages with that of the mercury-displacement dilatometer. The testing of mortar or concrete models of structures appears to be a promising field of application for internal-strain gages.

Details on the fabrication of the NBS waterproof gage may be obtained by writing to this publication.

Powers Heads Rawlplug

Frederic B. Powers has been made President of The Rawlplug Co., Inc., New York City, manufacturer of industrial anchoring devices. He succeeds the late Winthrop R. Howard, founder and President of the company since its inception in 1921. At the time of his new appointment, Mr. Powers was Vice President and Secretary. He joined The Rawlplug Co. in 1934.

Convention Calendar

December 5-7—SASHO Meeting
Annual Meeting, Southeastern Association of State Highway Officials, Charleston, S. C. D. H. Bray, State Highway Engineer, Kentucky Department of Highways, Frankfort, Ky.

Jan. 8-10, 1952—National Constructors Meeting
Annual Meeting, National Constructors Association, Waldorf-Astoria Hotel, New York, N. Y. J. F. Pritchard, President, National Constructors Association, 50 E. 41st St., New York 17, N. Y.

Jan. 15-18, 1952—HRB Meeting
Annual Meeting, Highway Research Board, National Academy of Sciences Bldg., Washington, D. C. Fred Burggraf, Acting Director, 2101 Constitution Ave., Washington 25, D. C.

Jan. 21-24, 1952—ARBA Meeting
Annual Meeting, American Road Builders' Association, Rice Hotel, Houston, Texas. Lt. Gen. Eugene Reybold, Executive Vice President, International Bldg., Washington 4, D. C.

Jan. 27-31, 1952—AED Meeting
Annual Meeting, Associated Equipment Distributors, Stevens Hotel, Chicago, Ill. P. D. Hermann, Executive Secretary, 360 N. Michigan Ave., Chicago 1, Ill.

Feb. 10-14, 1952—National Sand & Gravel and National Ready Mixed Concrete Assns.
Annual Conventions, National Sand & Gravel Association and National Ready Mixed Concrete Association, Stevens Hotel, Chicago, Ill. V. P. Ahearn, Executive Secretary, 1325 E St., N. W., Washington 4, D. C.

Feb. 25-28, 1952—AGC Meeting
Annual Convention, Associated General Contractors of America, Statler Hotel, Detroit, Mich. H. E. Foreman, Managing Director, Munsey Bldg., Washington 4, D. C.

March 3-7, 1952—ASTM Meeting
Spring Meeting and Committee Week, American Society for Testing Materials, Hotel Statler, Cleveland, Ohio. C. L. Warwick, Executive Secretary, 1916 Race St., Philadelphia 3, Pa.

March 19-21, 1952—N. Y. Highway Engineers
Annual Convention, New York State Association of Highway Engineers, Hotel New Yorker, New York, N. Y. Convention Secretary, Harry Spitzer, Box 38, State Office Bldg., Babylon, Long Island, N. Y.

April 1-4, 1952—New York Safety Meeting
Annual Convention, Greater New York Safety Council, Hotels Statler and New Yorker, New York, N. Y. Paul F. Stricker, Executive Vice President, 60 E. 42nd St., New York 17, N. Y.

April 7-9, 1952—Lubrication Meeting
Annual Meeting and Lubrication Show, American Society of Lubrication Engineers. Hotel Statler, Cleveland, Ohio. W. F. Leonard, Secretary, 343 S. Dearborn St., Chicago 4, Ill.

New Electric Drills

Portable electric drills in ¼, ⅜, and ½-inch capacities have been introduced by Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill. They feature a dynamically balanced armature, precision-cut heat-treated alloy-steel gears, and forced ventilation.

The Superduty drills are available in various models with a wide range of speeds. The ¼-inch drill offers a pistol-grip or saw-type handle. The ¼-inch models and some of the ⅜ and ½-inch models have ball and needle bearings throughout.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 927.

This ¼-inch drill is one of three new Superduty drills.

UNLIMITED

DEMANDS
LOW-COST AGGREGATE

OVER $56½ billion backlog is practically unlimited construction! Think of the aggregate needed... of the equipment you'll need to produce your share, and keep costs low!

Whether your job calls for 60 tons an hour... *or 600*... there's a Cedarapids aggregate plant that will turn out the exact quantity and quality you need, at the lowest possible cost per ton.

As a typical example, check the figures of this Concrete Materials & Construction Co. plant, with the Cedarapids 5050 Double Impeller Impact Breaker...

- ✓ **Originally scheduled to produce 400 tons per hour.**
- ✓ **600 tons per hour daily average maintained!**
- ✓ ***724 tons per hour peak production average!***

And here's why you get such low production costs with Double Impeller Impact Breakers...

- ✓ ***Maximum* output of cubical shaped aggregate required in so many specifications.**
- ✓ **Approximately 50% less contact of stone on metal, because such a high percentage of material is broken in suspension.**
- ✓ **You get an extremely high ratio of reduction at extremely low power costs.**
- ✓ **You save on your plant investment because you can eliminate much accessory equipment such as secondary crushers, conveyors, hoppers, screens, elevators, etc.**

Get ready for your share of the big jobs ahead with a Cedarapids Double Impeller Impact Breaker in your plant. "Construction Unlimited" means OPPORTUNITY UNLIMITED for you when you're prepared for bonus production. You can get very prompt delivery on all four sizes of Double Impeller Impact Breakers. See your Cedarapids distributor today for a profitable future.

14,472 TONS! PEAK DAY PRODUCTION FOR THIS CEDARAPIDS DOUBLE IMPELLER IMPACT BREAKER

HERE'S real tonnage! Concrete Materials & Construction Company put through 14,472 tons of aggregate on their peak day, when the surge pile was down and plenty of trucks were available for feed. More and more contractors are depending on Cedarapids Double Impeller Impact Breakers for the bonus production necessary to meet today's unlimited demands for low-cost aggregate!

AVERAGE DAILY PRODUCTION 600 TONS PER HOUR!

Cedarapids
Built by IOWA

Headquarters for
COST-REDUCING EQUIPMENT

U. S. Pat. Nos. 2373691
2486421
Canadian Pat. No. 439371

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa, U.S.A.

The first course of penetration macadam goes down on Brewster's turnpike section as a Mack dumps stone to a contractor-built spreader box on a D8.

Asphalt, penetration 100-120, is sprayed on by a Lansdell distributor.

Then a Buffalo-Springfield 3-axle roller packs down the choke stone, and it's time for the second layer.

Turnpike 'Hottest' Job in Jersey

Tight Schedule, Tough Spex, and Other Problems Test the Ability of Paving Contractors; Radio a Big Help

By MICHAEL A. SPRONCK,
Associate Editor

• SEVEN contractors are working to meet the mid-November deadline of what is probably the biggest paving job of its type in the world. The 118-mile New Jersey Turnpike is the longest asphaltic-concrete job ever undertaken with so short a schedule, and all hands are anxious to get it done on time so that tolls can start paying off the $250,000,000 investment. It's anyone's guess, as this story goes to print, whether or not they'll meet the schedule.

Seven contracts for paving the full length of the turnpike were let by the Turnpike Authority, late in 1950, as follows: Sections 1 and 5, S. J. Groves & Sons Co.; Section 2, A. J. Savin Construction Co.; Sections 3, 4, and 7, George M. Brewster & Son; Section 6, Gull Contracting Co., and Tully & Di Napoli. Section 4, midway on the turnpike, is typical and indicates the tremendous job that has had to be done. George M. Brewster & Son got Contract 62 for the section at a low bid of $7,086,872.

Paving work on the 24½-mile strip includes everything from the subbase

(Continued on next page)

Here are two of the four Madsen plants Brewster erected and Tioga used to produce turnpike hot-mix. Below is a view from farther away, showing bins, conveyors, and one plant.

C. & E. M. Photos

Four Hot-Mix Plants on One Site Produce 500 Tons an Hour To Meet Autumn Deadline for Turnpike Paving

• IT'S quite a sight to see four huge asphalt plants sitting side by side, each turning out 2-ton loads every minute. That's 8 tons every minute, or almost 500 tons per hour.

George M. Brewster & Son bought and erected the plants to supply asphaltic concrete for paving contracts 61 and 62 on Sections 3 and 4 of the New Jersey Turnpike. The plant operations, hauling, and laying of the hot-mix, however, were subcontracted to Tioga Construction Co., Lancaster, Pa. Operations started early in July with two of the plants, and were going full swing a short time later.

Brewster crews are putting down a gravel subbase and a penetration-macadam base. The hot-mix is required for the two leveling courses and the surface course. In all, the two paving sections will require 380,000 tons of hot-mix—a tough job in view of the tight time schedule and problems of access caused by "missing" bridges. When C&EMonthly visited the job, the four plants were producing over 5,000 tons a day. On September 21, the tonnage was 6,196.

Hot-Mix Design

Turnpike specifications have been notoriously close on all phases of work —not surprising since the roadway is designed for 36,000-pound axle loads and over. However, the Turnpike Authority has not been averse to minor modifications of the specifications where it could be shown that another method

(Continued on page 24)

C. & E. M. Photo

With penetration macadam in, subcontractor Tioga Construction Co. takes over to mix, haul, and lay the hot-mix. Here two of Tioga's Barber-Greene finishers are fed by Ford trucks. Umbrellas protect the operators of the two 10-ton Galion rollers which follow close behind. Note the wide median strip for the turnpike.

up. With actual work starting in July, that left only 5 months in which to turn out some 792,000 square yards of 18½-inch-thick pavement—pavement that has to conform to a tough set of specifications for the anticipated axle loads of 36,000 pounds and more. The contract also includes 450,000 square yards of shoulders, 510,000 square yards of topsoil and seeding, and 260,000 linear feet of sod curb.

Pavement Cross Section

Base for the turnpike pavement consists of common embankment topped by a frost-free layer, both previously placed by the grading contractor. The paving itself includes a 6½-inch gravel subbase in two courses, 7½ inches of penetration macadam in two courses, and 4½ inches of hot-mixed asphaltic concrete in three courses.

The various layers of the turnpike "pyramid", each succeeding layer coming in a few inches, to a top course of exactly 24 feet. Or looking at it the other way, each layer is wider by a few inches than the one above it. The top hot-mix layer is 24 feet wide, the next is 24 feet 4 inches, and the next 24 feet 8 inches. The two penetration-macadam layers are 25½ and 26 feet. The subbase is 26 plus.

Specifications originally called for two layers and the use of side forms on the hot-mix courses. However, the paving contractor convinced the Turnpike Authority that he could meet the required thickness and surface tolerance by applying the hot-mix in three layers without side forms. True to his word, he has kept the wearing course within a tolerance of ⅛ inch in 16 feet.

Laying the Subbase

Brewster crews started laying subbase gravel using their own specially designed spreader boxes which are front-mounted on Caterpillar D8's. They found out later, though, that they could speed up operations by just end-dumping the 10 to 12-ton gravel loads directly from the trucks onto the road surface. With accurate dumping and a bit of grader blading, a level course was easily obtained.

The 6½-inch subbase goes down in two courses: 3½ inches, then 3 inches. Size gradations are the same for both.

Sizes	Per Cent Passing Square Sieves
3-inch	100
2-inch	85–100
¾-inch	50–75
No. 4	25–50
No. 200	0–5

Each course is compacted to a 95 per cent density by a 3-wheel roller, a Bros Wobble Wheel roller, and a 50-ton Bros Compactor, in that order. French drains installed across the subbase at various points insure proper drainage.

Getting adequate supplies of stone or gravel has been no easy job for any of the contractors. Ed O'Neill, Project Manager for Brewster, said they examined 200 gravel pits in the area before they found 5 that had material meeting the turnpike spex. On most of the sections they "sweetened" the gravel with crushed stone to meet requirements. Maximum one-way haul from the gravel pit to the job is 22 miles.

Penetration Macadam

The 7½-inch penetration macadam is laid in two courses. The lower 4½-inch layer contains stone up to 3½ inches; the upper 3 inches, stone to a maximum of 1½ inches. Gradation of the stone for these two courses is:

(Continued on next page)

GENERALS

GO IN—GET THE LOAD—CARRY IT OUT AND OVER THE HIGHWAY

FASTER! EASIER! At Lower Cost!

GENERAL D. T. L. with deep, sharp, angled cleats and sturdy, high shoulder lugs. Designed for maximum traction on soft surfaces—forward or backward.

GENERAL H. C. T. for trucks that go off-the-road to pick-up, deliver loads. Free-rolling tread and stronger body for more miles, more safety.

GENERAL NON-DIRECTIONAL CLEATED

Best for dump trucks. Self-cleaning tread for extra drive-wheel traction forward or backward.

GENERAL TRACTOR GRADER

For power wheels—sharp, self-cleaning tread for extra traction. For front wheels—easy steering, smooth riding ribs.

Specify GENERAL TIRES ON YOUR NEW EQUIPMENT

C. & E. M. Photo

Tioga's Paving Superintendent Ward Hildebrand uses a Motorola portable radio to contact the asphalt plant on the New Jersey Turnpike job.

Turnpike Is Hottest Job in New Jersey

(Continued from preceding page)

Sizes	Per Cent Passing Square Sieves Lower Course	Upper Course
3½-inch	100	....
3-inch	90–100	....
2½-inch	70–95	100
2-inch	30–60	90–100
1½-inch	5–20	35–70
1-inch	0–5	5–20
¾-inch	....	0–5
No. 200	0–2	0–2

Kingston Trap Rock, North Jersey Quarries, and New York Trap Rock Companies have supplied most of the stone on this section, and hauls are long.

Both layers are placed with Brewster's own spreader boxes. About ten of these units are now working on various Brewster contracts and according to all reports they are doing a fine job.

A Vibro-Tamper compacts the first course of macadam and a Huber 13-ton three-wheeler rolls it. Asphalt is shot on the compacted material at a rate of 1.9 gallons per square yard. A Temple spreader rear-mounted on 10-ton Macks then chokes the course with ¾-inch stone, and a Buffalo-Springfield 3-axle "bump" roller brooms and rolls in the choked stone. The second course is laid the same way except that the 3-wheel roller isn't needed for the initial compaction.

Lansdell Co., Hackensack, N. J., furnishes the 100 to 120-penetration asphalt, trucking it down to the site from the Esso refinery in Bayonne, N. J. The asphalt is transferred on the job from the 4,000-gallon trailers to 1,800-gallon distributors which Lansdell makes up in its own shop, and is applied in a 12½-foot strip at about 325 degrees F.

Seal coat for the macadam is 0.35 gallon of penetration asphalt per square yard covered with ⅜-inch stone. A Littleford power sweeper does the brooming on this work.

Radio a Big Asset

Radio has been the salvation of the paving contractor. Current steel shortages delayed construction of a number of the turnpike bridges, and this means that the contractor has had to route and re-route his trucks and equipment over local rural roads. But mobile radio units have offset this handicap a great deal. The Brewster outfit has always been radio-conscious and could be expected to get maximum use of its sets on this job.

Brewster has three of the turnpike paving contracts, Sections 3, 4, and 7. It has 5 radio stations to tie in the various job sites and the home office. Main transmitter-receiver stations with 200-foot antennas are located at Jamesburg, Cranbury, Secaucus, Burlington, and the home office at Bogota, N. J. These stations, and the 35 portable units installed in the cars or trucks of key personnel, go a long way to reduce waste motion on the job. The entire radio system was designed and installed by Motorola.

Three-Layer Hot-Mix Top

Tioga Construction Co. of Lancaster, Pa., subbed the hot-mix for the leveling and wearing courses of Sections 4 and 3. The Brewster outfit, however, purchased and erected the asphalt plants for this work. It set up four Madsen plants with a capacity of 2 tons per minute each, at a site near the middle of Section 4, giving a haul of approximately 35 miles to the south end of Section 3, and 12 miles to the north end of Section 4. The actual haul is longer than this, though, because of the "missing" bridges. Brewster supplies the aggregate and asphalt; Tioga crews take care of the mixing, hauling, and laying. (The accompanying article, page 20, gives full data on the materials, plant setup, and mix design.)

Tioga started by laying the far ends of the job first, figuring to make the long hauls during the warm summer months and the short hauls during the autumn. About 135 trucks were used at first, decreasing as the job progressed and the hauls became shorter.

C. & E. M. Photo

A Buffalo-Springfield 3-axle roller irons out high spots detected by a bumpometer.

The 8 and 10-ton loads are brought to Barber-Greene finishers in tarpaulin-covered dump trucks. Two finishers work together on each 24-foot roadway, one tailing the other by about 50 feet in the adjacent 12-foot lane. The hot-mix went on at about 275 degrees F during the summer months. The laying temperature was increasd during cold spells in the fall.

Two Galion 10-ton tandem rollers

(Concluded on next page)

ALL 5 CLRC TESTS, standardized by the Co-ordinating Lubricants Research Committee, prove Shell Rotella Oil superior to the average of leading diesel lubricants . . . from every critical standpoint: parts-wear, corrosion resistance, ring-sticking and piston fouling.

Moreover, further tests, such as the Modified Lauson Lacquer Rating Test and Shell's own extremely severe Four Ball Test . . . all add proof upon proof that Shell Rotella Oil *does* keep engines clean longer . . . *does* extend time between overhauls . . . *does* reduce parts wear.

FLEET SERVICE confirms engine test results!

Read these authorized reports:

Yellow Cab Company, Nashville, Tenn., has 75 cabs, running 24 hours daily. They write: "We have always had trouble with sludge forming in the crankcase of our motors due to the constant start and stop driving . . . On some cabs this sludge completely blocked the passage of oil through the pump screen . . . bearings were burned out.

"After months of operation on Shell Rotella Oil we are glad to report that the *motors (thus far) examined have been found entirely clean, the pump screen as bright as brand new, and we have had no bearing trouble of any nature.*"

Creston Transfer Company, Grand Rapids, Michigan, haul uncrated furniture to the East Coast and southern cities. Creston began using Shell Rotella Oil nearly 4 years ago to correct a serious overhaul problem due to short valve life in their trailer truck engines. Shell Rotella Oil has increased valve life from 8,000 miles to better than 40,000 miles and greatly reduced all-around maintenance costs. Creston Transfer is now expanding with hauls to nearly every state. The proved lower maintenance through using Shell Rotella Oil is a basic part of Creston's expansion planning.

SHELL ROTELLA OIL . . . EXTENDS

follow the finishers, working about 100 to 500 feet behind. Then, after surface checking with a "bumpometer", the Tioga crews iron out the rough spots with a Buffalo-Springfield 3-axle tandem roller. Water for the rollers is brought up in a 750-gallon tank mounted on a GMC Model 350 truck. Transfer is made using a side-mounted 1½-inch Jaeger pump.

The bumpometer has two fixed wheels on a light beam and can be pushed along like a baby carriage. A third wheel, midway between the other two, is free-floating and rides along the surface, checking rises or depressions in the roadway. This wheel is keyed to an electric circuit and registers surface variations of ⅛ inch in 16 feet. A bell rings for high spots and a buzzer sounds at the low spots. One man pushes the bumpometer along while another chalks the road at the areas that require further rolling. The Buffalo-Springfield 3-axle roller follows close behind to iron out the bumps. This procedure is followed for all three courses of hot-mix.

C. & E. M. Photo

Headquarters for the Tioga "brass" were in these four neatly furnished trailers made by Mobile Sportsman, Marysville, Mich.

The Tioga crews have been laying about 5,000 tons of hot-mix a day. That's over 13,000 linear feet of 1½-inch surface—a really fireball pace. The paving Superintendent on Section 4 gives a good deal of credit for the fast job to the Tioga radio setup. "Don't know how we got along without it before," he says. Tioga has a fixed station at the plant and eight portables in the field, all Motorolas bought for this job. The setup is independent of the Brewster system, operating on a different frequency. The pickups, incidentally, have a loudspeaker mounted on top of the cab so that incoming calls can be heard a good distance away if the operator leaves the truck.

Personnel

George M. Brewster & Son, prime contractor on Section 4, is employing about 375 men. Work is under the direction of Edward F. O'Neill, Project Manager; Albert Vonder Esch, Assistant Project Manager; R. W. Buhl, Resident Engineer; and Jim Ransome, General Superintendent.

Tioga Construction Co., subcontractor on the hot-mix, has about 60 men on the job, counting both plant and road crews. Over-all work for Tioga is directed by Walter McMinn, President, and John McGarry, Vice President and Project Manager. Plant operations are supervised by George Atkin, Plant Superintendent, and Ted Schell, Engineer of Materials. Ward Hildebrand is Superintendent of Paving on Section 4.

Representing the N. J. Turnpike Authority are members of DeLeuw-Cather, consulting engineer: Robert Richards, Project Manager; Quigley Fletcher, Project Engineer; F. Simpson, Resident Engineer on the north half of Section 4; and John Harris, Resident Engineer on the south half.

You can EXTEND TIME between overhauls...

SHELL ROTELLA OIL slashes maintenance costs–Maintains engine efficiency

1. Positive ANTI-ACID ACTION

Shell Rotella Oil drastically reduces wear in the vital top-cylinder zone by counteracting the acid action of unburned fuel particles. This protection is extremely important in engines with intermittent loading.

2. Constant DISPERSANT ACTION

The excellent dispersant properties of Shell Rotella Oil permit it to dissolve contaminants and hold them in suspension until draining time. This prevents premature fouling.

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Is the direct result of reduced top-cylinder and ring-face wear. Moreover, new or reconditioned engines operating with Shell Rotella Oil show a welcome extension of the "low oil consumption" period because of this same reduced wear. The above gains, combined with freedom from fouling and a significant increase in valve life, enable you to extend time between engine overhauls.

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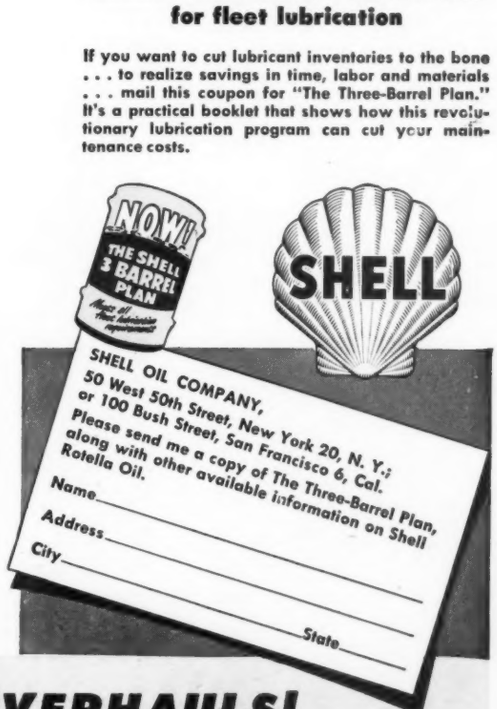
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or 100 Bush Street, San Francisco 6, Cal.
Please send me a copy of The Three-Barrel Plan, along with other available information on Shell Rotella Oil.
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Address
City
State

TIME BETWEEN OVERHAULS!

Construction Accidents Fewer, but More Serious

In a pamphlet dealing with accident rates in the construction industry during 1950, the National Safety Council gives statistics which show that during that year the average frequency rate of 19.34 was 1 per cent lower than the rate for the previous year. This comparatively favorable figure is, however, offset by the severity rate of 2.72, which rose 27 per cent, stopping the downward trend of the past three years. In this category, 1949 scored the lowest rate on record, while the 1950 rate was the highest since 1946. For purposes of comparison, the all-industry reduction rate for both frequency and severity of accidents was 8 per cent. Among 40 major industries, the 1950 frequency rate for construction accidents ranked 36th as against 34th in the previous year, and the severity rate ranked 37th compared with 33rd in 1949.

The pamphlet shows that in 1950 there was an increase of one-third in fatalities and permanent partial disabilities—a proportion which contributed substantially to the increase in the industry's severity rate. Temporary total disabilities, however, declined, thus causing a decrease in the industry's average rate for injuries, though the seriousness of this type of injury was greater in 1950 than in the previous year.

Since the base period 1935-39, the construction industry has made substantial reductions in both the injury-frequency and severity rates. The improvements have not, however, been equal to those made by all industries combined. These have averaged a 29 per cent reduction in the frequency rate and a 39 per cent improvement in the severity rate.

Copies of "1950 Accident Rates: Construction Industry" may be obtained from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. For members, the pamphlets are 35 cents each in quantities of 1-99; 29 cents each in quantities of 100 or more. The prices to nonmembers are double.

Cable-Controlled Bulldozer

A broadside on the No. 10S cable-controlled bulldozer is available from Caterpillar Tractor Co., Peoria, Ill. The complete bulldozer consists of blade, push arms, trunnions, weight box, cable, sheaves, sheave support, and radiator guard. The dozer is designed for mounting on the Caterpillar DW10 and has a width of a little over 10 feet. Construction and operating features of the unit are highlighted in the folder.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 917.

Four Hot-Mix Plants For Turnpike Paving

(Continued from page 20)

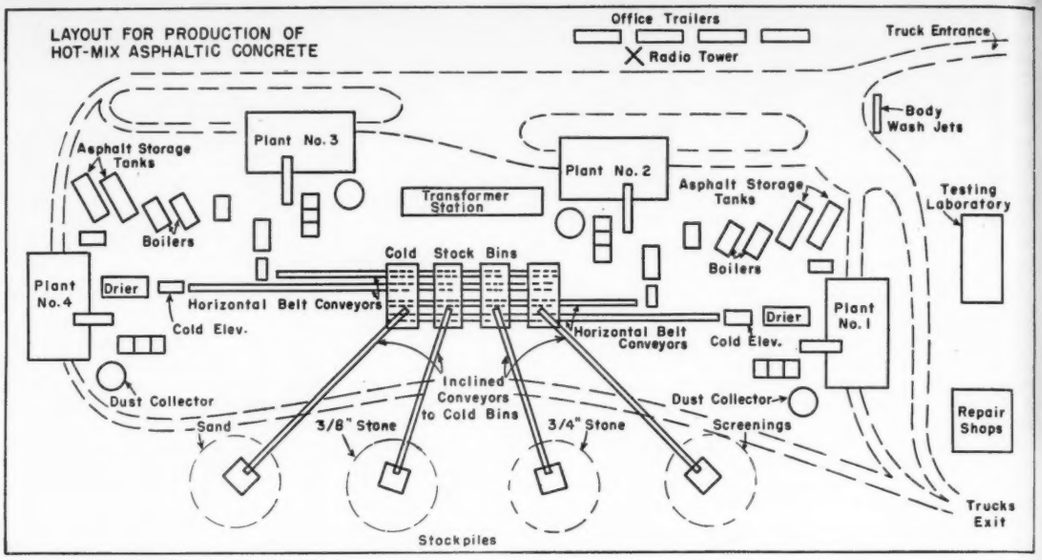
could obtain the required results.

Mix design for the asphaltic-concrete courses is as follows:

Aggregate	Per Cent Passing Square Sieve: Leveling Courses	Wearing Course
1 inch	100	100
¾ inch	95–100	95–100
⅜ inch	52–62	67–77
No. 4	35–41	45–51
No. 8	29–35	37–47
No. 30	21–27	25–31
No. 100	4–8	4.5–8.5
No. 200	1.5–3.5	2–4
Asphalt (per cent by weight of total mix)	4.55–4.95	5.05–4.45

The 85 to 100-penetration asphalt for the hot-mix comes into the plant at a temperature of 330 degrees F. This is checked regularly, along with a constant testing of other materials and finished products.

The sand used in the mix is a Norcross natural siliceous sand brought up from Pemberton, N. J. The ¾ and ⅜-inch stone and stone screenings are quarried from diabasic traprock at the North Jersey Co. quarry in Bound Brook, N. J.



Plant Operations

The plant site is near Cranbury, N. J., west of the turnpike and near the middle of Section 4. Sections 3 and 4 are 21.7 and 24.5 miles long respectively, and that means a maximum haul of 33 miles to the south end of the job. Everything is brought to the site by truck—stone from three sources in Jersey; asphalt from the Esso refineries in Bayonne, N. J.; and sand from Jersey.

Rugged 6-wheel Macks roll up to the aggregate stockpiles with the frequency and regularity of main-street busses. As they add their 20-ton loads to the tops of the piles, a Caterpillar D6 noses the material into open hoppers near the base of the piles.

Four Barber-Greene conveyor belts, 30 inches wide and 180 feet long, carry the aggregate up in an endless line to the cold stock bins. Each bin is "mated" to a pile: one each for sand, ⅜-inch stone, ¾-inch stone, and screenings. The screening bin is a 250-ton-capacity Blaw-Knox. The others have capacities of 300 tons.

The aggregates feed through the bins down onto four 30-inch horizontal Barber-Greene conveyor belts which lead to the cold elevator of each plant. Each belt passes continuously under the four bins and receives a supply of all aggregate sizes, properly proportioned by Syntron vibrating feeders set at the base of the bins. The cold elevator carries the material up into the dryer. This unit, a standard part of the Madsen plant, is 84 inches in diameter, 24 feet long, and is heated by four Hopkins Volcanic burners.

The hot elevator then carries the aggregate up another 37 feet into the hot storage bins. Before dropping into these bins, the aggregate passes over four Symons horizontal vibrating screens. The screens separate the aggregate into four sizes—less than 1 inch, ⅝ inch, 5/16 inch, and No. 6. The four hot bins have a total capacity of 12½ tons. The aggregate then feeds into a 2-ton weigh-box for a 10-second dry-mixing cycle. The Hardy electric automatic controls for weigh-batching are a novelty in the east. These controls are used on all of the turnpike work and the operators like them.

Asphalt is hauled from the Esso Standard Oil Co. refinery in Bayonne, N. J., in 5,000-gallon tank trailers. It is pumped into one of the four 10,000-gallon steam-jacketed storage tanks at the plants. These storage tanks, inci-

(Concluded on next page)

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C. & E. M. Photo

An operator on Madsen plant No. 2 controls the dump into the waiting truck. Hardy scales in all the plants gave automatic control of aggregate batching.

dentally, are mounted on low-bed trailer frames to simplify moving when the plants pull out. Asphalt is heated by 110 and 150-hp Scotch marine boilers with 3-inch steam coils. Weighed manually, the asphalt is discharged into the pugmill through pressure injection. The complete batching cycle is 55 seconds.

Twice each day the inside of each truck body is sprayed with a No. 2 diesel fuel oil. Waiting time is eliminated by having five taps on the line, each with a separate hose and spray gun.

Power, Water, Communications

Power for the job comes from a 33,000-volt line, stepped down through transformers to 440 volts. The various motors on the four plants are Westinghouse or General Electric. These include 50-hp on the dryer, a 125-hp for the pugmill and hot elevator, a 60-hp for the exhaust fan on the dust collector, and 10-hp units for the screens. Boilers and dryers use a bunker C fuel oil, fed from two 10,000-gallon mobile tanks set near the center of the plant layout.

Water needs for the job—drinking, washing, boilers, etc.—were met by driving a 125-foot well right on site. The well delivers about 700 gallons an hour to a 125-gallon storage tank. From here it is pumped at 40 psi to the various outlets.

Tioga has complete radio facilities for the plant and field crews. The Motorola two-way radio system includes a main station and eight portables. The crews report good reception—up to 45 miles on the fixed-to-mobile stations, and 15 miles for mobile-to-mobile use.

Testing Laboratory

A cinder-block building set near the plants serves as the testing lab. Periodic tests are made on the coarse and fine aggregate, asphalt, and plant-mix.

The laboratory equipment includes:

2 Tyler Shakers
1 Gilson shaker
1 Marshal testing machine
2 Dulin Rotorex machines
1 Maryland extractor
1 solvent reclaimer (home-made) and various scales

Carbon tetrachloride, used in the lab for extraction tests, is recovered by a solvent reclaimer made by Ted Schell, Engineer of Materials for Tioga. This not only saves money but also means less worry about the supply of carbon-tet, mighty hard to get these days.

Personnel

Plant operations are directed by John McGarry, Project Manager and Vice President of Tioga. Walter McMinn, President of the company, also takes an active hand in job supervisions. George Atkin is the Plant Superintendent; Ted Schell, Engineer in Charge of Materials. Paving superintendents on the two sections are Ward Hildebrand and J. Marshall. S. Henderson is Field Engineer. Tioga has about 24 men operating the plants, 25 men in the field, and 8 on administration.

Representatives for the Turnpike Authority are Robert Richards, Project Manager, and Quigley Fletcher, Project Engineer, both of DeLeuw-Cather, consulting engineer.

C. & E. M. Photo

Tioga Construction Co. had complete radio facilities for plant and field crews. Here's the 200-foot radio mast at the asphalt-plant site.

A New Hard-Facing

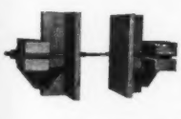
A new hard-facing alloy has been developed by Wall Colmonoy Corp., 19345 John R St., Detroit 3, Mich. Wall-ex is an oxyacetylene hard-facing rod for abrasion resistance, with good impact and corrosion-resisting properties, the company says. It is available in 3/16, ¼, and 5/16-inch diameters, 8 to 12 inches long.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 862.

McCluskey an IRF Director

Roy E. McCluskey, Vice President and General Sales Manager of the LeTourneau Co., Peoria, Ill., has been elected to the board of directors of the International Road Federation. The Federation is the official spokesman for the highway industry and associated manufacturers in connection with the foreign programs of the Economic Cooperation Administration.

NEW!-"HEX-LOCK"



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because it's BALANCED

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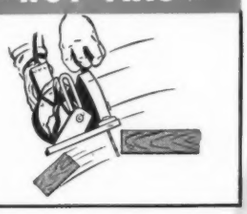
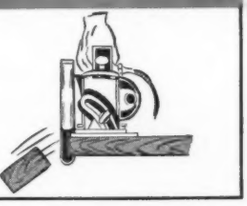


A left-bladed saw falls with the waste piece at the end of a cut-off . . . puts extra strain on your muscles . . . requires you to lift the saw's whole weight twice as many times each day.

BUT THIS



The balanced, one-hand Speedmatic is supported by the work — not you. You're a carpenter, not a weight-lifter...so use the saw that takes the load off your hands — Speedmatic!

A Speedmatic handles easier than any other power saw. Why? It's *balanced!*

Balanced while you use it. The blade is on the right. Saw always rests on the main piece, not the cut-off—doesn't nose over at the end of a cut. And the extra-broad base prevents tip or tilt.

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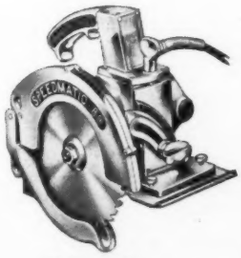
Here's what Speedmatic balance means to you! It actually makes your job *easier* . . . actually leaves you *less tired* at the end of a day's sawing. Prove it yourself. Ask your distributor to let you test a Speedmatic.



MODEL K-89
8" blade 2 ¾" cut
Three other sizes: 7½", 10¼", 12"

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PORTER-CABLE Machine Co.
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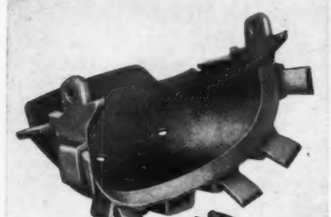

These Tap-In teeth are now standard on all Parsons Trenchliners.

Tap-In Bucket Teeth

Bucket teeth that tap in are now standard equipment on all Trenchliners. According to Parsons Co., Box 431, Newton, Iowa, the self-locking Tap-In tooth features easy-in and easy-out replacement, with no bolting or crimping of edges to hold the teeth in position. A precision-fit taper locks the tooth firmly in place either on buckets or side cutter bars. The tooth holders are cast integrally with the bucket lip for positive tooth support. By welding adapters to the buckets, you can convert Trenchliners of any age to use Tap-In teeth.

Made of alloy steel and heat-treated, Tap-In teeth are designed with added clearance for maximum wear before replacement becomes necessary, the company says. They need not be reversed.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 929.

New Elevating Tower

The new American tubular elevator tower, Model III Type PT, comes as a complete unit, including the tower, one landing panel, and one entrance panel. Additional intermediate sections and landing panels may be ordered, as well as a 2-part line and concrete equipment. Hoist and cable are extra. All are available for purchase or rental from the manufacturer, American Tubular Elevator Co., 700 North St., Zelienople, Pa.

Actual capacity of the unit is 3,000 pounds; maximum height 117 feet. The company reports that three men can erect 50 feet of the working tower in one hour. Only 11 simplified component parts are needed, it says, and all units are completely assembled as far as practical. Braces and girts are attached by Universal's Economy Notch brace mechanism. Once the cage has been assembled, bolting is required only for the landing panels, securing the cathead to the top of the tower, and erecting concrete equipment.

The PT tower takes concrete equipment similar to the conventional American tubular automatic-dump design. A 13-cubic-foot-capacity bucket and a 16-cubic-foot-capacity hopper are available. A 2-part line can be used to reduce required hoist power.

Further information may be secured from the company by requesting Bulletin No. 734. Or use the Request Card at page 16. Circle No. 863.

Self-Loader for Trucks

The Holmes Owen loader for truck mounting is featured in a bulletin prepared by Ernest Holmes Co., Chattanooga, Tenn. It points out that this unit enables one man to handle all three jobs of loading, hauling, and dumping. Mounted under the truck cab, the loader extends in front of the truck, scooping up material and passing it overhead into the dump body. The shovel front of this unit has a capacity of ½ cubic yard and it folds out of the way during driving and dumping. All mechanical specifications and features of the unit are outlined in the bulletin. On-the-job photos show the loader performing various types of work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 993.

How to Lift Safely

"Heave-Ho!" is a pocket-size booklet telling workers, by means of two-color cartoons, the right and wrong way to lift heavy loads. Published by the National Safety Council, the booklet is designed to reduce lifting accidents by impressing a few simple rules on the mind of the man who does the lifting.

Copies of "Heave-Ho!" may be secured from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. The price for members is as follows: In quantities of 1 to 9, $.12 a copy; 10 to 99, $.07; 100 to 999, $.06; 1000 to 4,999, $.045; 5,000 to 9,999, $.04; 10,000 to 19,999 $.035; 20,000 or more, $.03. Prices are double for non-members.

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Beautiful Bridges

(*Photos on page 4*)

A beauty contest is generally associated with girls, but the American Institute of Steel Construction, Inc., of New York City, has other ideas. Since 1928 the Institute has been running annual contests in which the entrants are all bridges. This year, the jury of architects and engineers had a field of 97 entries from which to choose the three most beautiful steel bridges opened to traffic in the United States during 1950. Stainless-steel plaques will be awarded for the three winners. Eight bridges received honorable mention.

The winners were as follows:

Class I, for bridges with spans of 400 feet or more—Columbia River Bridge, Wenatchee, Wash.; owner, State of Washington Department of Highways; designer, George Stevens, Department bridge engineer; fabricator, American Bridge Co.

Class II, for bridges with spans under 400 feet, costing over $500,000—South Holston River Bridge on Tennessee State Highway 34, Sullivan County, Tenn.; owner, State of Tennessee; designer, Tennessee Valley Authority; fabricator, Virginia Bridge Co.

Class III, for bridges with spans under 400 feet, costing less than $500,000—Caldwell Avenue Bridge, over Edens Expressway, Cook County, Ill.; owner, Cook County; designer, Cook County Highway Department; architect, J. Edwin Quinn; fabricator, Bethlehem Steel Co.

Honorable mention was given to the following bridges: in Class I—A. Piatt Andrew Bridge over the Annisquam River in Gloucester, Mass.; in Class II—Yazoo River Bridge, north of Vicksburg, Miss., and G. H. & S. A. Railroad Overpass, Gulf freeway, Houston, Texas; in Class III—Route 4 Parkway Overpass, at Route 25, Middlesex County, N. J.; Manitou Road Barge Canal Bridge, Towns of Greece and Ogden, Monroe County, N. Y.; Swatara Creek Bridge, on the eastern extension of the Pennsylvania Turnpike near Harrisburg; Niles Street Pedestrian Overpass, in Leominster, Mass.; and Kern River Bridge, Kern County, Calif.

Herbert M. Hale Dies

C&EMonthly announces with regret the death of Herbert M. Hale, civil engineer, at his home in Orient, Long Island, N. Y., on September 1, 1951.

Mr. Hale was for many years prominent in heavy construction in and around New York City. Born in Somerville, Mass., he gained early experience in his father's carriage-building shop. After graduating in 1904 from the Harvard Engineering School, he went to New York in 1905 to get field experience of the subway construction in progress there, and worked with the old Rapid Transit Commission on the Fort George tunnel section in uptown Manhattan. Two years later he joined the staff of the New York City Board of Water Supply to work on original design and was active in the construction of the Catskill Aqueduct tunnels.

A tunneling expert, Mr. Hale on his next project filled the position of chief engineer to the firm of Holbrook, Cabot, Rollins & Fry, which was awarded a contract to construct a tunnel for the Catskill water supply from 14th Street, Manhattan, under the East River into Brooklyn. Other big jobs followed, including a return to subway construction, and in 1928 Mr. Hale became associated with the contracting firm of Spencer, White & Prentis, Inc., for whom he was Managing Engineer in charge of the difficult Nassau Street Loop of the BMT Subway. Soon afterwards, Mr. Hale was chosen by the New York City Sanitation Department as Chief Engineer of Construction on its huge sewage-treatment plant at Ward's Island, where he had to direct 19 contracts. Later he was again Managing Engineer for Spencer, White & Prentis on a section of the Sixth Avenue Subway and the foundation for the new Criminal Courts Building. During World War II he was in charge of construction of the Bayonne, N. J., Dry Dock. He had retired a few years before his death.

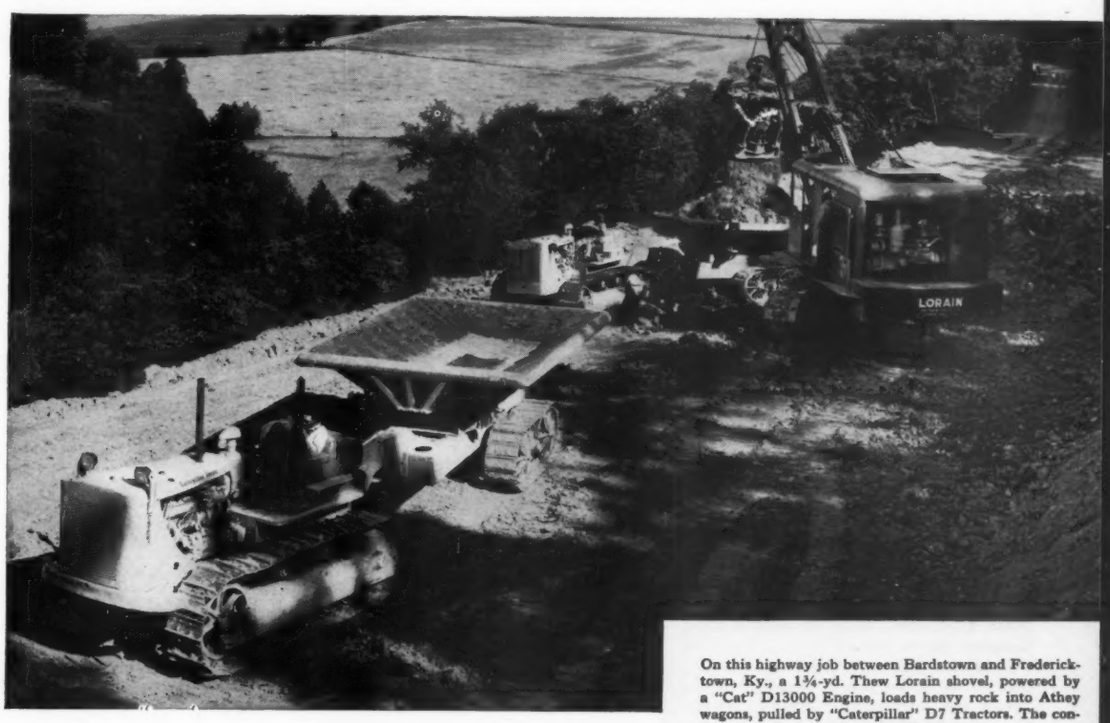
Mr. Hale was active in engineering societies, having served two years as President of the Harvard Engineering Society. He was also a member of the American Society of Civil Engineers. His outside interests were many and varied: he was an accomplished photographer, painter, cabinetmaker and flutist—once, in his early days, he played first flute for two seasons in a New York symphony orchestra. Perhaps it is not surprising, since he was a collateral descendant of Nathan Hale, that Mr. Hale's chief avocation was history. He devoted the last five years of his life to it and to the founding of the Orient Historical Society.

Catalog on Optical Transit

A 16-page catalog highlighting the design and operating features of the F-S Model 4150-R repeating-type optical transit is available from Trans-Global Co., 1480 Broadway, New York, N. Y. This instrument, it points out, has many new features: an optical plummet and reading system, a repeating lever to simplify repetition of angles, compact design, and precision construction.

The catalog includes complete specifications and detailed drawings. It treats the unpacking and setting up of the instrument; the use of the telescope and reading microscopes, the horizontal and vertical circles, the repeating device; operation procedures for distance and levels; and the checking and adjusting of the instrument. Additional data are given on the illumination device for the telescope field, the instrument carrying case, and accessories.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 858.



On this highway job between Bardstown and Fredericktown, Ky., a 1¾-yd. Thew Lorain shovel, powered by a "Cat" D13000 Engine, loads heavy rock into Athey wagons, pulled by "Caterpillar" D7 Tractors. The contractor is W. C. Snyder, Danville, Ky.

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Prestressed Silos Built for Cement Co.

Eight Storage Silos With 120,000-Barrel Capacity Erected at Oro Grande Plant of Riverside Cement Co.

By RAYMOND P. DAY

• PRESTRESSING—the concrete-strengthening technique which makes thin walls take enormous loads—was employed for the new plant of Riverside Cement Co. at Oro Grande, Calif. Eight new cement-storage silos, with a total capacity of 120,000 barrels, have been constructed by J. E. Haddock, Ltd., of Pasadena, Calif., contractor on the project. Construction of the big silos represents one of the final steps in a modern cement plant which Riverside Cement Co. has been 5 years developing.

Designed by the Los Angeles consulting firm of Leeds, Hill & Jewett, the silos are unusual in more features than the prestressing one. They are equipped with special aerating equipment, which admits compressed air to the bulk product and makes it flow like water. This insures a positive method of handling and speeds up delivery.

Eight Silos

Eight silos were involved in the Haddock contract, which was scheduled for completion by October 1, 1951. The silos are 70 feet high, 37 feet in diameter, and have walls which taper from 9 inches at the bottom to 7 inches at the top. The silo bases, the upper 2 feet of wall, and the roofs were built of standard concrete. The main walls were made with pneumatically applied mortar, with prestressing wires applied after the Gunite developed its designed strength.

Between each two silos is a pump pit, which is set down about 10 feet below the floor of the storage silos. The silos have conical bottoms which slope to a central opening, and the cement is taken out in exactly the same manner in which solids leave the clarifier tanks in most modern sewage-disposal plants.

The prestressing technique used was that developed on this project by Prestressed Concrete Corp. of Kansas City, Mo., and that firm had the mechanical subcontract for the prestress work. Case Gunite Co. of Wilmington, Calif., had the other main subcontract for application of pneumatically shot mortar.

It is common practice to "nest" both cement and grain silos by joining at the interstice points. However, for both structural and operational reasons, the Oro Grande silos were constructed as separate units. This made feasible the method of prestressing that was used.

Work Sequence

Foundation excavating was the first order of work. Then came construction of the pumping pits, silo foundations, wall Gunite and steel reinforcement, topping-out and roof construction, prestressing, installation of aeration piping, spiral stairways and bridges, and final cleanup.

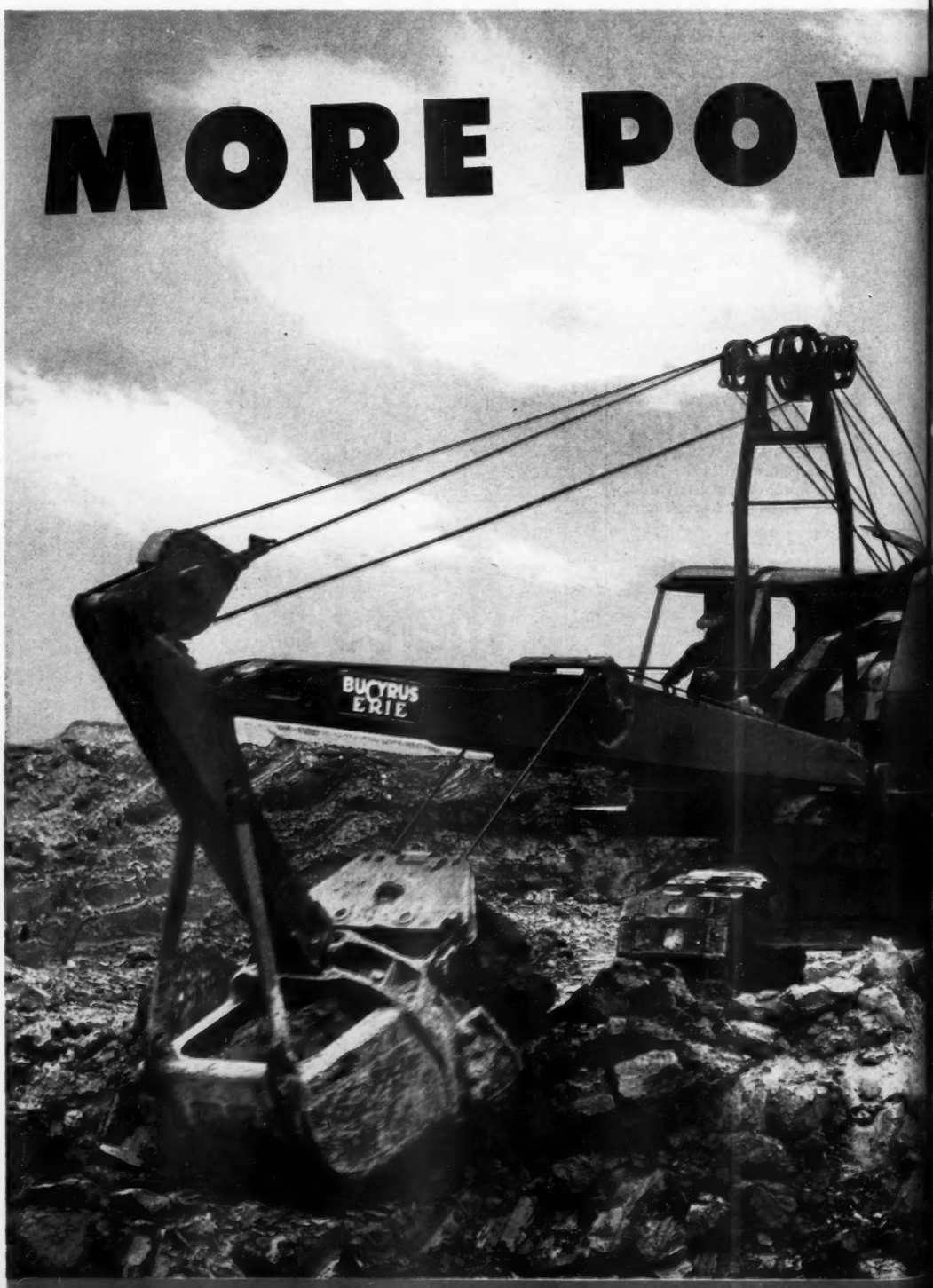
There was a considerable amount of conventional wooden formwork connected with the pump pits and silo foundations. The forms were made up in panels to fit the foundations, and since they were identical, it was possible to re-use the forms until the last foundation was finished.

Construction of these silos was much more involved than the mere erection of simple cylindrical tanks, because of the precise nature of prestressing. One of the interesting sidelights, for example, was the fact that the finished circumference of the tank had to be practically perfect so prestressing crews could cut the wires to the proper length to develop the designed tensile pull of 135,000 psi. Each wrap by the Prestressed Concrete Corp. method is made separately by joining two halves of the circumference with anchor fasteners. This method is believed to be unusually accurate, but from the construction standpoint is a source of concern. How well the problem was

(Continued on next page)

C. & E. M. Photo

A DeWalt saw is busy in the carpenter yard at the Oro Grande, Calif., site of new cement silos. In background, 2 of the 8 silos designed by Leeds, Hill & Jewett.



handled can best be told by giving the results. In no measurement made up to the time the project was visited did the circumference, over 115 feet in length, vary more than 1½ *inches* from what it should theoretically be!

The method used to insure straight walls of true diameter was as follows: First a control template was accurately set from the radius point and secured on the foundation slab. The scaffolds were braced securely and guyed off in four directions. The templates—one for reinforcing steel, one for Gunite—marking the top of each wall lift were then set on outriggers from the scaffold and plumbed carefully over the control template below.

Wall Gunite

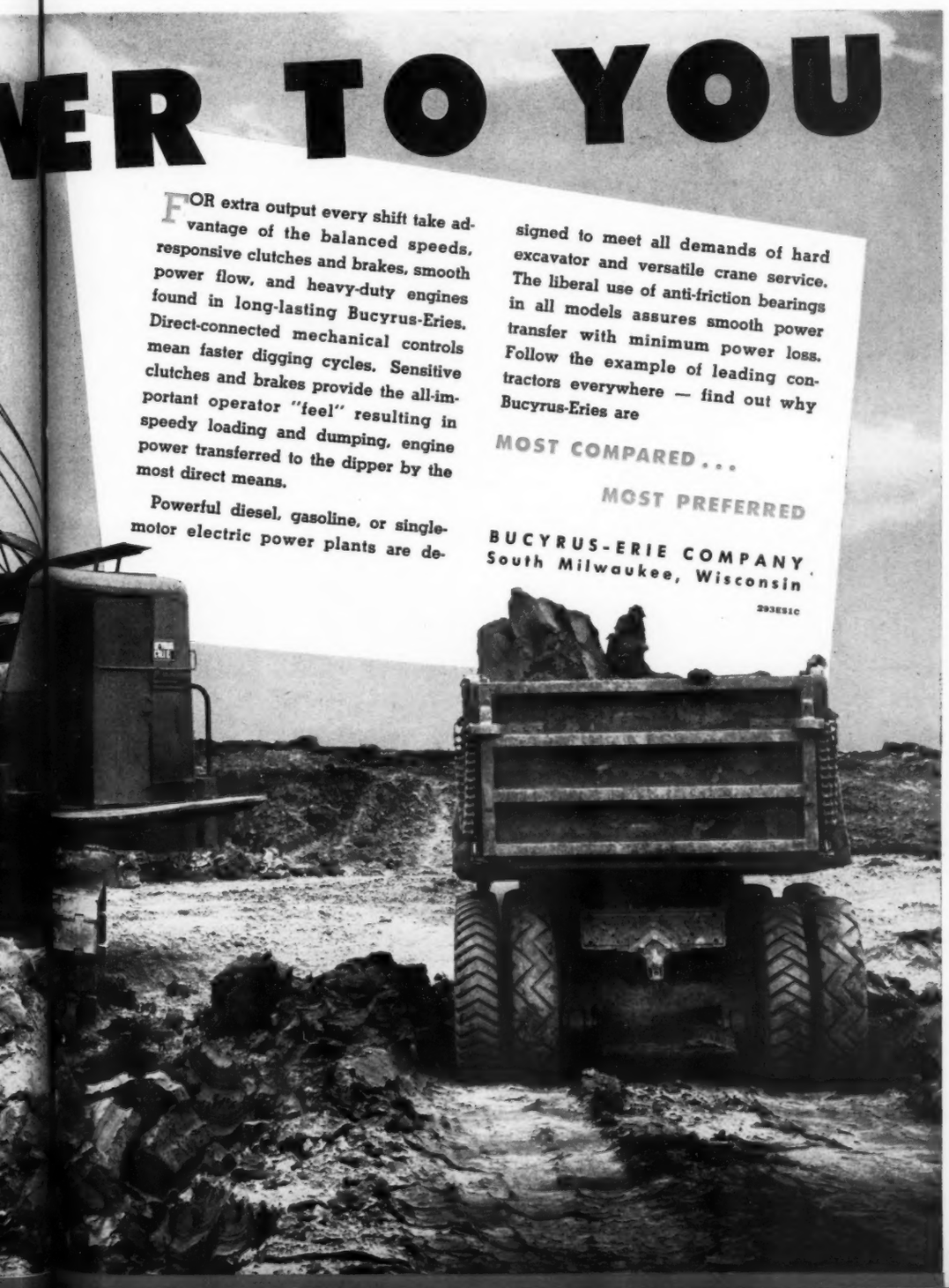
Wall Gunite was applied to form the various lifts in two operations. Each silo was constructed in four lifts. There was a 5-foot lift first of all from the foundation, which covered the section where reinforcing steel was heaviest. Lifts 18, 28, and 17 feet high then followed, and the upper 2-foot standard-concrete wall and roof section came last.

The Gunite walls were applied in two passes. The inner half of each lift was applied first, by shooting the mortar against a wooden diaphragm formed with ¼-inch plywood, wired to the reinforcing steel. When the inner half of the particular lift was complete, the plywood was stripped away, the formed surface was sandblasted, and the outer half of the lift was then completed. The Gunite received a 14-day water cure to develop 4,000-pound strength.

The Gunite mix consisted of 3.5 parts of sand and one part of Riverside portland cement by volume. The damp sand was handled from a stockpile by a small Ford-mounted skip loader, which dumped 0.26 cubic yard to the skip of a Ransome 16-S mixer. The materials were then thoroughly blended, and they passed in damp form to a motor-driven elevator which lifted the material about 15 feet. The damp material then passed through a shaker screen,

C. & E. M. Photo

On the Riverside Cement Co.'s prestressing project, wires have to be held in exact position by template ribbons on the silo sides. A workman punches accurate holes in soft metal strap material for this purpose.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covered with ⅝-inch mesh, which removed any large particles which might have accidentally gotten in the sand.

An operator then admitted the mortar aggregates and cement to the Cement Gun Co. pressure pot. Two 500-cfm Le Roi compressors furnished a steady flow of air to drive the material out to the two application nozzles, where water was blended with the dry material as it shot out at extreme pressure. Each silo is equipped with one manhole to give permanent access to the inside of the silo. Any rebound material from the Gunite operation could thus be shoveled out by men working below.

485 Wires Per Silo

There are 485 prestressing wires in each silo. They consist of ¼-inch-diameter high-carbon steel with an ultimate tensile strength of 200,000 psi. The wires are naturally spaced closer at the base of each silo, where the internal load is greatest, and centers range from 0.95 inch at that point to 4 inches near the top. Around the manhole opening was placed a heavy steel plate with slots at each side of the actual opening to hold the ends of the prestress wires.

Each wire, encircling the silo, was applied by taking two halves of the total circumference, stressing these halves at two diametrically opposite points simultaneously, and anchoring them so the finished wire would exert an average pull of 135,000 psi. To get this result, the pull at the two jacking points reached about 180,000 psi while the ends were being anchored.

The anchors which hold the ends of the wire together consist of mild-steel horizontal threaded sleeves with threaded washers which fit inside. The ends of the wires were upset in a hydraulic press to form a ball, after slipping the washers and sleeves into position. The peaning machine headed about 5 wires a minute. The wires were cut to length by unwinding them from a spool, measuring them through a ½-inch pipe which was cut to the proper length, and cutting them off. After the wires were cut, headed, and equipped with anchors, they were hung up on the silo sides on template ribbons, which were also cut and punched to proper dimensions in the field.

In order to get an average stress of around 135,000 psi in the wires, it was found necessary to couple alternate wires at diameter points 45 degrees apart on the circumference. The method used was to apply one half of the wires from the bottom to the top with the equipment, two stressing units, at opposite ends of a diameter. The other half of the wires was later stretched with another set of units located at opposite ends of a diameter 45 degrees

(Concluded on next page)

Prestressed Silos Built for Cement Co.

(*Continued from preceding page*)

from the first. A silo was completely prestressed when both sets of units reached the top.

Elaborate equipment was devised to make the prestressing pull, and to hold the wires without movement while men screwed the hexagon-shaped sleeve over the threaded washer and made it snug with a wrench. The jacks and holding jaws were Prestressed Concrete Corp. design, and weighed about 900 pounds. But a pump-actuated hydraulic piston type of power failed to work satisfactorily, and had to be replaced by something more positive.

The jacking power finally used consisted of an air-boosted hydraulic cylinder, with an effective booster ratio of 16 to 1. The air supply at the Riverside Cement Co. plant furnished 90 pounds of pressure. Approximately 30 cfm was taken from this supply, passed through a Norgren ½-inch vitalizer unit, and through a 2-way valve and pressure regulator. A 4-way pilot-operated valve with poppets actuated the air piston and developed a reciprocating motion. This air piston had an 8-inch diameter and a 6-inch stroke.

The pressure regulator allowed the machine to be set at the required pull. The pull on each wire was measured by a permanent dynamometer installed in the line of pull of the jack. The operation of a stressing unit was such that when set for the required pull, the pistons stopped and held a constant hydraulic pressure while the wire was being anchored.

As this equipment made a prestressing pull, the jacks and holding jaws were about 4½ feet back from the end of each wire. When the designed pull was reached, men brought the ends together, started the sleeve-screw washer anchor by hand, and then tightened it snug with a wrench. There were about 2 inches of tolerance in each sleeve to take care of any inequality of elongation in the pull. When the sleeve and washer were tight, the operator reversed the lever of the 4-way valve which controlled the power mechanism, and the pull was relaxed. The machines, which hung suspended from the silo tops by ¼-inch cables, were then raised to the next wrap. With two sets of stressing units in operation and the crews on a 9-hour shift, the rate of stretching wires was 60 per shift or an average of one wire every 9 minutes.

After the wires had been installed, a protective Gunite coating one inch thick was applied to prevent the stressing wires from rusting.

Roof Supported Below

A structural-steel framework hung from the top of the Gunited walls made elaborate falsework to support the roof pours unnecessary. The beams consist of 18-inch WF members which were placed one by one by a Northwest 25 crane equipped with a 110-foot boom, and welded in place. The crane was also used to transfer the roof concrete to the point of pour.

Personnel

This project was designed and construction was supervised for Riverside Cement Co. by Leeds, Hill & Jewett, consulting engineer of Los Angeles. The firm was represented on the job by T. T. Brooks, Resident Engineer. The general contractor was J. E. Haddock, Ltd., represented in the field by Dell Martin, Superintendent. L. C. Smull is Vice President and Howard Starke is Director of Engineering for Riverside Cement Co.

Riverside Cement Co. is one of the major cement-producing companies in southern California, and the current enlargement program represented by the construction of new production facilities at Oro Grande is one more example that private enterprise is meeting with invested money the ever-expanding challenge for more building materials throughout the world.

Sewer Liner Plates

A broadside on vitrified-clay liner plates for sewers has been prepared by Universal Sewer Pipe Corp., 1500 Union Commerce Bldg., Cleveland 14, Ohio. It includes a photo of each product, on-the-job illustrations, specifications, and installation drawings.

Both flat and curved plates are available in sizes for lining either plain or reinforced-concrete sewers, monolithic or precast sewers, storm and sanitary sewers, and sewage-disposal tanks. The plates are adaptable for relining existing sewers and for repair work.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 920.

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STANDBY FEATURES . . .
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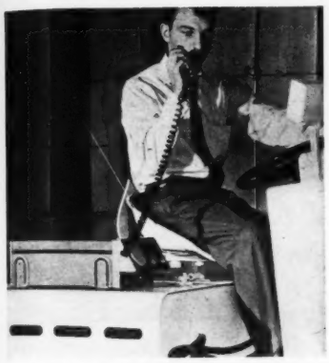


The Motorola F M 2-way radio for industrial application is shown mounted on a fork-lift truck. It makes available continuous communication facilities between the driver and a central dispatcher.

A Low-Power Radio For Plant, Yard Use

A low-power 2-way radio utilizing the Uni-Channel Sensicon receiver is available for industrial installations. The maker, Motorola, Inc., Communications and Electronics Division, 4545 W. Augusta Blvd., Chicago 51, Ill., points out that low-power Uni-Channels can be installed as base stations or as mobile units. They can be mounted and used on tractors, loaders, lift trucks, or other intra-yard equipment to speed material movement.

The unit meets FCC regulations, allowing a maximum power input of 3 watts to the final amplifier, for industries which carry on 2-way radio communications within a single plant or yard area—as for contractors, ready-mix-concrete producers, asphalt-plant operators, and the like.

The compact transmitter-receiver units are available either as a single package with built-in speaker and control head, or with individual speaker and control head. They may be operated from a 6-volt dc, 12-volt dc, or 117-volt ac primary power source.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 852.

Sprayable Materials Tested in a New Lab

A laboratory for testing the pumping and spraying qualities of such materials as coatings, adhesives, sealers, and greases has been opened by Gray Co., Inc., of Minneapolis, to furnish highly specialized data to manufacturers and users of fluids and semifluids and to refiners of petroleum products. Companies east of the Mississippi are invited by the Gray Co. to submit samples for free testing.

Further information may be secured from the Gray Co., Inc., Testing Laboratory, 2124 Fairmount Ave., Philadelphia 30, Pa. Or use the Request Card at page 16. Circle No. 923.

Floor and Roof Slabs, Precast and Prestressed

A new and interesting booklet on Strestcrete, a system utilizing precast, prestressed concrete for floor and roof slabs, has been prepared by the Strestcrete Division of Basalt Rock Co., Inc., Napa, Calif. Strestcrete slabs of lightweight concrete units and prestressed steel are assembled into panels and delivered to job sites ready for installation. They are manufactured in multiple widths of 16 inches and in depths of 3 to 16 inches; panels up to 8 x 30 feet are available. The company reports that the slabs are practical for all types of building construction and are adaptable to structural-steel or poured-concrete frames. They may be used for arch, flat, gabled, saw-tooth, and slanting roof designs.

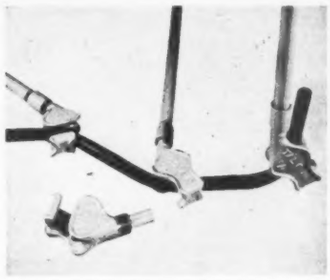
The 16-page booklet describes in detail the basic principles of the Strestcrete system, its cost and construction features, and its applications. Short-form specifications are included along with design tables of loads and spans —for construction with or without a 1½-inch concrete topping. There are detailed drawings of typical installations. On-the-job photos show how Strestcrete accommodates a variety of requirements such as flue openings, stair wells, flush-type lighting fixtures, venting and drain pipes.

The company has also prepared, and offers free, a pictorial resume of sheer and bend tests made on Strestcrete floor and roof slabs.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 938.

Six-Way Bending Tool

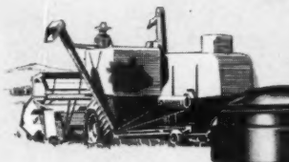
A bending tool which can be used in six different directions has been developed by Tal Bender Inc., 417 N. Water St., Milwaukee 2, Wis. The Tal 6-way Hickey with its six no-slip bending jaws can be used for making bends, elbows, sets, offsets, loops, saddles, and stubs on open or slab work and in close quarters, the company says. The stub hole is a new feature devised for bending or straightening conduit protruding from concrete floors or walls. The long safety neck extends into the pipe handle, eliminating accidents caused by the pipe handle breaking. The sure-grip jaws reduce the hazard of the pipe slipping during the bending operations.



This bender, the Tal Hickey, can be used in 6 different directions.

Further information may be secured from the company. Or use the Request Card bound in at page 16. Circle No 926.

FIGHTING HEART ...of all this equipment!



Chrysler Industrial 15— one of eight basic models.

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CHRYSLER Industrial Engines

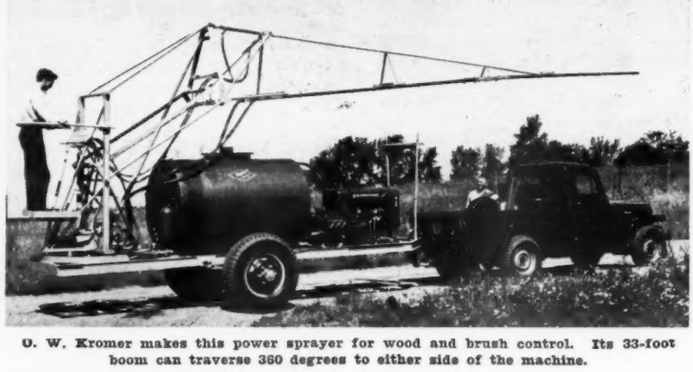
HORSEPOWER WITH A PEDIGREE

All-Purpose Lube

An all-purpose lubricant of the Bentone type has been developed by Hood Refining Co., 601 S. Pennsylvania Ave., Greensburg, Pa. Multiplex lubricant is produced in grades from No. 00 to No. 3 and made with a bodying agent designed to give it stability under all service and storage conditions. It has no melting point and retains its lubricity and adhesive characteristics under all temperature conditions normally encountered, the company says. Insoluble in water, it will absorb moisture when in service without losing its adhesive or lubricating qualities, and the manufacturer therefore recommends it for use wherever moisture is a problem.

Multiplex contains no metallic soaps or fatty acids and is plastic or pumpable at temperatures from 20 degrees below F to 15 degrees above F, depending upon the grade.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 871.



O. W. Kromer makes this power sprayer for wood and brush control. Its 33-foot boom can traverse 360 degrees to either side of the machine.

New Roadside Sprayer

A portable power sprayer for weed and brush control on highway roadsides has been developed by O. W. Kromer Co., 1120 Emerson Ave., N., Minneapolis 11, Minn. It features a 33-foot boom that can traverse 360 degrees to either side of the machine. The boom can be controlled in height from 3 to 10 feet above the ground surface, and is equipped with a series of hydraulic cylinders to permit it to follow the contour of the land. A panel of 5 hydraulic control valves in front of the operator permits raising and lowering of the boom and controlling the flow in each section of the boom.

A 600-gallon tank with a mechanical agitator provides an adequate supply of spray chemicals to cover a large area without refilling. Material is delivered at 800-pound pressure by a pump with a capacity of 35 gpm. The sprayer has electric brakes and can be towed behind a Jeep or other moderate-sized vehicle.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 936.

Bidders on Army Contracts To Submit Alternate Designs

A broader policy for contractor bidding on specified types of Air Force buildings was announced last September by Lieutenant General Lewis A. Pick, Army Chief of Engineers and head of the Corps of Engineers—contracting agency for both the Army and Air Force. This policy covers construction bids on various types of Air Force dormitories, as well as mess and administration buildings. It permits alternate construction details to be bid in competition with the designs prepared by the Corps of Engineers.

Standard plans have been distributed to local builders' exchanges and similar organizations, and it was explained that the Corps of Engineers does not permit any lowering of the general standard of quality or size. The alternate designs must conform to the basic limiting dimensions, physical criteria, and Federal standards. While alternate bids require accompanying data, drawings, and specifications, it is only necessary that these be in sufficient detail for ready evaluation. The advertising period will be not less than 30 days.

Opens Ohio Oil-Filter Plant

Fram Corp., Providence, R. I., opened a $1,000,000 automotive oil-filter plant at Greenville, Ohio, in September. During a two-day open house, distributors and manufacturers watched complex production lines spin out oil filters and replacement cartridges at the rate of 40,000 per day. Fram expects that the plant, when working at top production, will employ 650 people and turn out 12,000 filters and 40,000 cartridges per day.

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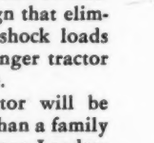

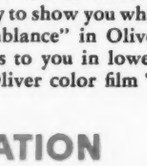

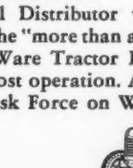

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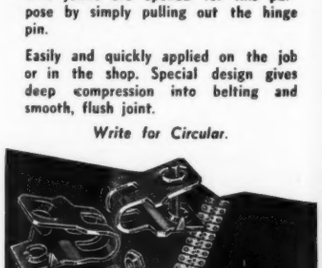
Write for Circular.



ARMSTRONG-BRAY & CO.
5352 Northwest Highway CHICAGO 30, U. S. A.

Paving Crew Extends Concrete Boulevard

Interesting Problems Are Met as Crew Struggles with Proper Finishing; Mix Is Air-Entraining

• IN Missouri's St. Louis area, the Fred Weber contracting organization is known as a pace-setter in paving construction. Contractors and engineers alike know that when better methods are developed, Weber will likely be the outfit that pioneered the development.

Going like a house afire, the Weber organization had finished about 136,000 square yards of concrete paving in two jobs by May 30 in the 1951 construction season. And then it hit one of the toughest projects it has tackled this or any other year: the widening and extension of Delmar Boulevard in St. Louis with the use of air-entrained portland-cement concrete. In the 1.1-mile job there were some 36,000 square yards of paving, and the problems in connection with finishing the surface were numerous.

Missouri State Highway Department engineers who called for air entraining in the $290,000 job did so because side streets which bring drainage and traffic into Delmar Boulevard also bring in some surface salt. And since snow and ice-removal crews in winter often use salt, a pavement which would resist scaling was considered desirable. But it handled unlike anything Weber's men had so far tried.

Rubbery, tricky to spread and finish, the material is far different from ordinary concrete. Finishing machines have to stay behind a considerable distance and wait until the exact moment when the mix starts to stiffen before they go to work. Alert to trends in other states, Weber tried as hard as possible to simulate these methods in paving with air-entrained concrete. On ordinary cool days, the finishing machines stayed a considerable distance behind the spreader, and the use of water to sweeten the concrete surface was occasionally necessary.

Job Widens Boulevard

The Weber contract widens Delmar Boulevard and extends the important street to Price Road. Eventually, proponents of a further extension hope to push the street through to Lindbergh Boulevard, which carries U. S. 61 and U. S. 67. But the street touches on highly improved property in Clayton, Ladue Village, University City, Olivet, and Creve Coeur, so that extension may be some time in the future.

The job consisted of widening and extending the street on a grade previously established for the most part. Very little grading was necessary. The deepest cut—a 10-foot bank which was handled by four Allis-Chalmers HD-19's and 20-yard Gar Wood scrapers—was only about 150 feet long. The remainder of grading ranged from 12 to 18 inches of excavation, and consisted in most cases of removing the old road-mixed bituminous mat which made the street surface.

Grading, however, was an extremely interesting operation, and it illustrated why Weber is famous for new methods. The shallow-cut grading was handled by a Domor elevating grader, mounted on a Caterpillar No. 12 motor grader, which discharged the material to waiting dump trucks. In some cases the motor grader scarified the old mat, but much of the time the elevating grader loaded even that material.

It required at least 10 dump trucks, furnished by Missouri Trucking Co., to get rid of the material. One peak day the machine was digging 12 inches out of a cut 13½ feet wide, and in an 8-hour shift it cleaned up 5,800 linear feet. The graded material was split about 50-50. Some was used on the job to make shallow fills, and the other 50 per cent was hauled away and disposed of by Missouri Trucking Co.

Specifications also called for a 4-inch compacted subbase course of crushed rock. This material, consisting of 1-inch-minus material, was trucked in from Des Peres Quarry. Dumped ac-

(Continued on next page)

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Completely portable unit weigh batches aggregate on the job. Can be charged with front end loader from storage piles or directly from dump trucks. Single operator sets up unit for operation in 15 minutes. Weigh batches up to 50 cu. yds. per hour.

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• Bin selector located by skip control directs skip.
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Completely mobile concrete mixing and elevating plant eliminates cost of hauling and erecting expensive equipment. One man handles the entire operation from mixer to deck.

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ATTACHMENTS INCLUDE: Scoop buckets in various sizes, swivel and standard type concrete hoppers in ¾ cu. yd. capacities, lift forks, crane boom, track extensions with braces up to 26 feet overall.

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MIXERMOBILE MANUFACTURERS

WAGNERMOBILE

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Paving Crew Extends Concrete Boulevard

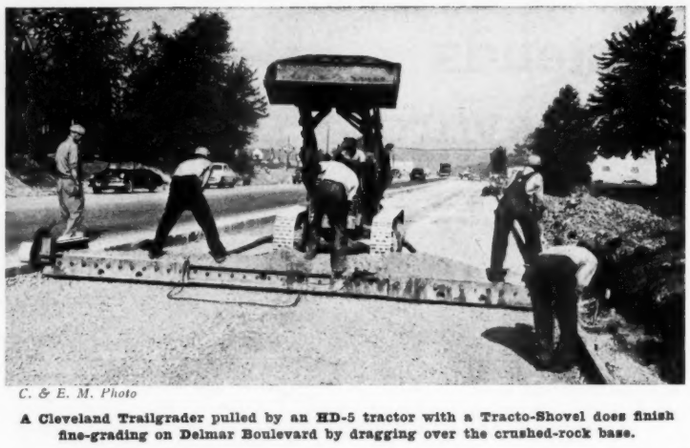
(*Continued from preceding page*)

cording to volume calculations to make the required thickness, the material was spread by motor grader, road-mixed to prevent segregation, sprinkled if necessary, and compacted. Both Bros rubber-tire Wobble Wheel rollers and a steel-wheel Buffalo-Springfield roller were used in the compaction. The subbase was left as close to finished grade as possible, but was carried slightly high to make sure there would be enough base material.

Razzle-Dazzle Paving

The project was far from uniform throughout its length. Finished widths range up to 86 feet, which includes a dividing esplanade. Strips 24 feet wide were included in the paving, but so were 22, 20.5, 8.5, 12.5, and 14.5-foot strips.

On a recently completed job, Weber was able to work when other contractors were idle by using a small Koehring 16-E rubber-mounted paver between the forms of narrow pours. The paver skip was boxed in at the end so dump trucks could unload the batches from the pavement at the side, and thus would not damage the grade in mildly wet weather. The scheme worked so successfully that Weber used the 16-E again on Delmar Boulevard. The machine poured those narrow strips impossible for the larger Koehring 34-E Twinbatch machine to reach, and poured the lanes where it was necessary to work a paver from finished pavement. The rubber-mounted 16-E is self-propelled, and has a hydraulically-actuated boom which can be raised and lowered.



C. & E. M. Photo

A Cleveland Trailgrader pulled by an HD-5 tractor with a Tracto-Shovel does finish fine-grading on Delmar Boulevard by dragging over the crushed-rock base.

Weber had two sets of paving equipment on the Delmar project, for a purpose. One set of narrow machines placed the three narrow-size lanes. A second set of wide equipment placed the 20- to 24-foot lanes. By moving one set of equipment to a new location while working the other on a pouring setup, Weber was able to keep paving going ahead steadily.

Paving-strip widths were so varied that no concrete spreaders were used in the machine lineup. It was too difficult and time-consuming to cut them down to the many adjustments that would have been necessary. The concrete was spread by the paving buckets somewhat more carefully than is usual, as a result, and a labor crew was employed to help out with the spreading and vibration.

Forming and Preparation

The concrete paving is all 8-inch uniform unreinforced slab. Weber had about 7,000 linear feet of Blaw-Knox steel forms available to contain the lanes. A labor crew prepared the form-base location by hand. This was not an extensive operation, for careful checking at the time the subbase was made and rolled insured that the crushed rock was already laid to near-perfect tolerance. As the men made minor finishing adjustments with their shovels, other men set the forms to a level established by string lines, referred to survey hubs which were slightly offset.

Form bases were tamped by a Cleveland form tamper, and some hand work was also used. Crushed-rock base is tricky to tamp mechanically, and some hand work was often found to be necessary.

The finish fine-grade was done by a Cleveland Trailgrader pulled by an International ID-9 tractor or by an Allis-Chalmers HD-5 with a Tracto-Shovel. The latter machine was more often used, because its front-end shovel acted as a crane to pick up the Trailgrader by a cable sling and move it back down the line. Excess material picked up by the Trailgrader was moved ahead by the Tracto-Shovel.

Expansion joints were practically eliminated in the new pavement design. There are only two joints of that type in the project—one at each side of a railroad crossing. Contraction joints, placed on 20-foot centers, consist of an asphaltic mastic strip. Longitudinal joints tying the lanes together consist of Laclede steel-formed keyways and ½-inch steel dowel bars to take the load transfer. The wide strips also have a center longitudinal joint, which is made by Laclede steel joint material set below the level of the slab.

All joint material, with the exception of asphaltic contraction-joint mastic, was installed prior to the pour. The use of steel keyway and joint

(*Continued on next page*)

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C. & E. M. Photo

A Cleveland form tamper compacts dirt and crushed rock under steel forms on the Weber job.

making about three passes with the first finisher, an excellent surface was produced.

The contraction joints were made by cutting a wedge with a hand-operated steel knife, and inserting the asphaltic strip. The joints were dressed and the lanes were rounded near the forms by the use of edging tools. The pavement was membrane-cured by a hand spray outfit.

Pavement strips were poured generally by placing the center strip first, and working one side until that side of the center line was finished. Then the machines moved over to the opposite side. The outside strips run very close to property lines, so the rubber-mounted paver came in very handy.

The forms were pulled next day by bringing in a flat-bed truck, pulling the pins with a Cleveland hand puller, cleaning the sections with shovels, and moving them ahead to the next setup.

An additional complication on this project was the construction of curbs,

(*Concluded on next page*)

strips, which fastened to the ground on pins and stuck flush against the side of the forms, made it unnecessary to drill the forms and bolt the keyways on as was necessary only a few years ago.

Pouring and Finishing

Close behind the form and fine-grading crew came the paving equipment. The lineup on both wide and narrow lanes consisted of either the 34-E Twinbatch or the 16-E rubber-mounted paver, a spreading crew, a Blaw-Knox finishing machine, a Koehring longitudinal float finisher, the small joint-insertion knife, and various hand-finishing operations.

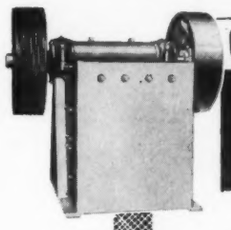
The dry concrete batches came from a nearby commercial plant owned and operated by Aggregates, Inc. Weber has its own concrete-batching facilities, but the firm recently got more state highway work west of St. Louis, and it chose for this project to buy the dry batches nearby and move its batching equipment west to get the other work started as soon as possible.

The air-entraining solution, which entrained about 5 per cent of air, was added at the paver by a Koehring dispenser. Mixing water came from a nearby hydrant on the St. Louis municipal water system. Water tank trucks and trailers kept the pavers supplied through a long flexible hose. Because the air-entrained concrete was doubly hard to handle when poured extremely dry, the men tried to keep it at least as wet as a 1½-inch slump.

The paver operator tried, insofar as possible, to spread the concrete evenly between the forms with his paver bucket. Finishing adjustments were made by the labor gang, and two vibrator men with Jackson stinger-type machines consolidated the edges near the forms and also vibrated the center concrete.

The Blaw-Knox finishing machine hung back at least 30 to 45 minutes behind the placing operation. This gave the internal bulk of the slab time to take on its initial set, and left the surface still finishable but firm enough so the large rock particles would not rubber or work up to the surface. If necessary, a small amount of water was added during the finishing operation. So far as inspections have been able to determine, the water had no bad effect. It permitted the surface to be finished smooth, and any excess rolled off outside the lane.

One thing was certain: the air-entrained mix handled far differently than regular concrete. When attempts were made to finish it like regular concrete, the slab was not smooth. Frequently the machines would work until the concrete set up beyond alteration, and the material got worse instead of better. By hanging back for a while, and then



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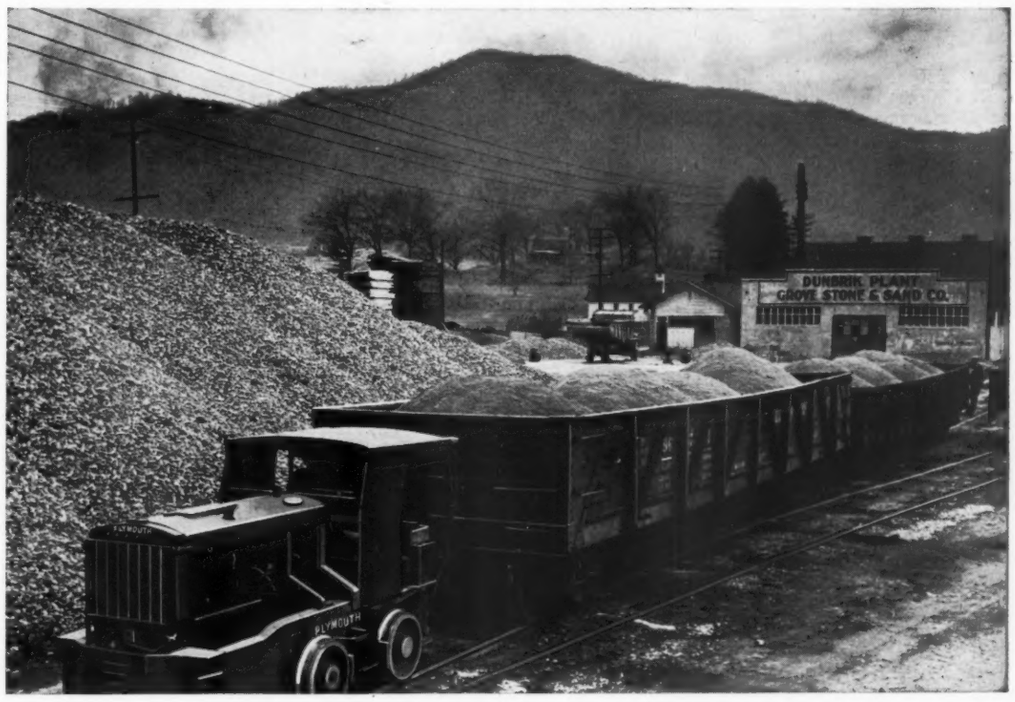

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Paving Crew Extends Concrete Boulevard

(Continued from preceding page)

gutters, and bricked drainage inlets. This auxiliary work is not often done on state highway department work. But the drainage inlets and gutters were placed just ahead of paving, and the curbs followed. Paving was completed by June 15, but sidewalks, curb, sod work on the dividing esplanade, and other incidental items ran the final completion date close to September 1, 1951.

The Delmar Boulevard project is being watched carefully by interested officials of the Missouri Highway Department, the Portland Cement Association, and by representatives of the various cement companies to determine future methods and design data for the improved type of concrete product.

Personnel

Rex M. Whitton heads up the Missouri State Highway Department organization responsible for the Delmar Boulevard extension and widening, with J. J. Corbett as Engineer of Construction and R. W. Hodson as Division Engineer at Kirkwood.

Fred Weber, Sr., had general charge of all contract operations, and is responsible in many instances for the alert and vigorous improvements the firm makes in paving technique from time to time.

Preventive maintenance is more essential than ever. The careful selection and use of good lubricants at regular intervals will keep your equipment operating efficiently.

The Baldwin Hydro-Electric hoist used with a pickup truck. It requires only 3 inches between the cab and the truck bed, and will dump a 4,000-pound load.

A Truck-Bed Hoist That Fits Any Truck

A hydraulic truck-bed hoist designed to fit any truck model is made by Baldwin Iron Works, Inc., 1000 McComas Ave., Wichita, Kans. It consists of a single hydraulic ram mounted in the center of the truck frame. The barrel of the ram is attached directly to the truck bed by a lifting bracket. The ram will lift loads of 12,000 to 16,000 pounds to a height of 72 inches.

The Baldwin Hydro-Electric truck hoist is powered by the truck battery through a heavy-duty starter motor which actuates the starter pump and raises the ram. It is not necessary to run the truck engine while dumping the load, the company says. The load can be stopped in any position by the push-button control on the dash panel. The entire unit requires 5 inches of space between the cab and the truck bed.

A similar unit is also available for pickup trucks. It requires 3 inches between the cab and the truck bed and will dump a 4,000-pound load, according to the manufacturer.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 999.

DTA Director Resigns

Henry E. English resigned on September 1 from the position of Director of the Street and Highway Division of the Defense Transport Administration. Edward D. Hicks, Jr., who has been Deputy Director of the Division since April of this year, will carry on as Acting Director.

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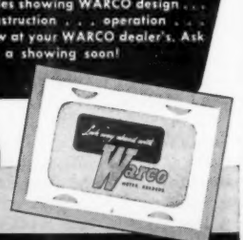

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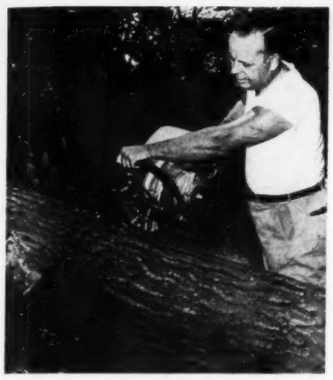

Something new in the woods—Disston's improved DO-101 one-man chain saw, featuring a low-profile chain, a more rugged crankshaft, and a narrower rail in a greater variety of lengths.

Improved Chain Saw

An improved one-man chain saw announced by Henry Disston & Sons, Inc., Power Chain Saw Division, Philadelphia 35, Pa., features a fast-cutting chain, sturdy crankshaft, rapid-action stop switch, and a new fan housing. A Kiekhafer 3.5-hp engine is standard on the Model DO-101.

Disston claims a smoother cutting action and increased lateral stability for the new chain, with teeth that can be sharpened with a single stroke of the file. The teeth are comparatively small, with a lowered cutting edge, shorter pitch, and rounded guiding lug that regulates the depth of the cut. The new raised and easily accessible toggle switch on the DO-101 is designed for quick starts and stops even when the operator is wearing heavy work gloves. The fuel-tank vent valve has been relocated to allow easy adjustment of the fuel mixture and to simplify maintenance, Disston says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 948.

Nylon-Lined Bearing

To overcome limitations which restrict the use of plain injection-molded or machined Nylon bearings for many applications, Thomson Industries, Inc., Manhasset, Long Island, N. Y., has developed the Nylined bearing. It consists of an outer sleeve of inexpensive metal and a relatively thin lining of Nylon bearing material. Nylon, the company points out, exhibits excellent properties under adverse lubricating conditions, or with no lubricant at all.

Nylined bearings can be furnished in the plain sleeve type or the flange type. When substantial thrust loads must be carried in addition to radial loads, the bearing is usually laid out to provide a separate surface of Nylon bearing material to take the thrust. Since Nylined bearings can be quickly fabricated to special dimensions without expensive or elaborate molds or dies, they can be furnished rapidly and economically on a custom basis, designed expressly for each application, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 942.

Tractor Fleets in Use

Fleet applications of TD-24 diesel crawler tractors are presented pictorially in an 8-page folder issued by International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. In addition to fleet scenes in the earth-moving, mining, pipelining, and lumbering fields, the folder also lists briefly the mechanical features of the 148-drawbar-horsepower International TD-24.

This literature may be obtained from the company by requesting Form CR-107-A. Or use the Request Card at page 16. Circle No. 995.

More Money Sought For N. J. Turnpike

The New Jersey Turnpike Authority has asked its bondholders to approve an additional $35,000,000 bond issue to complete the 118-mile New Jersey cross-state toll road, and to grant blanket authority to proceed with construction of connections with the Pennsylvania Turnpike and New York Thruway at an estimated cost of $42,000,000 by the issuance of "extension" bonds. Fifty-two insurance companies and other financial institutions purchased the original $220,000,000 worth of bonds. The new issue will bring the Authority's indebtedness to $255,000,000.

Five major reasons "beyond the control of the Authority" are cited for the rise of costs above the original estimates. These reasons are the Korean war and the general world situation; enlarged requirements of the local communities, counties, and state agencies which are affected by the turnpike location and construction; enlarged requirements of the railroads, power companies, and other utilities affected by the turnpike location and construction, changes in construction at Woodbridge following the wreck on the Pennsylvania railroad there last February; and increased real-estate costs.

Proceeds from the sale of the $35,000,000 bonds will be used to complete construction of the turnpike between Route 6 at Ridgefield Park and Deepwater, Salem County; while additional construction referred to by the Authority would, if approved, probably include the construction of a bridge across Newark Bay which would provide a connection from the Port Street interchange of the turnpike in Newark to Hudson County. Such a connection would help to alleviate the congestion and overloading on the Jersey City and Bayonne highways.

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Philpott Dam Contract Is Nearing Completion

This movable 41½-foot-high tail tower at the Philpott Dam site travels a 525-foot arc on tracks. A 428-ton counterweight keeps it from overturning.

Concrete for a Multipurpose Structure in Virginia Is Placed With an 8-Yard Bucket on 1,700-Foot Cableway

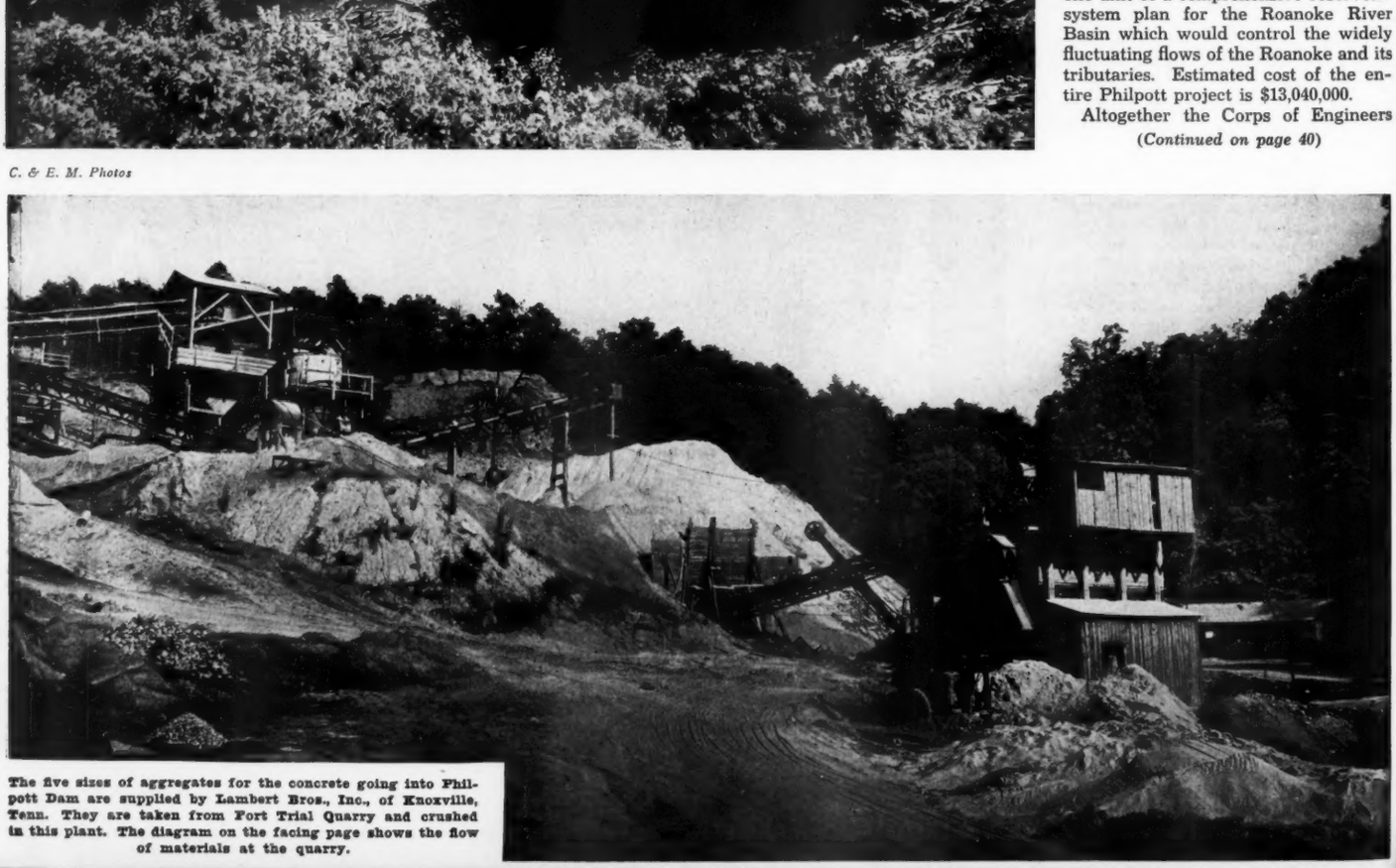
By WILLIAM H. QUIRK
Eastern Editor

• ALTHOUGH Philpott Dam will not be completed until early in 1952, it has been effective for flood control since early summer of this year. The entire project, including the powerhouse, is scheduled for completion by December, 1952. Disastrous floods, like those of 1928, 1937, and 1940, will be eliminated by the construction of this concrete barrier by the Corps of Engineers, U. S. Army, Norfolk District. Besides flood control, Philpott Dam and Reservoir are being constructed for the generation of hydroelectric power and other allied uses such as recreation and fish and wild-life preservation. It is one unit of a comprehensive reservoir-system plan for the Roanoke River Basin which would control the widely fluctuating flows of the Roanoke and its tributaries. Estimated cost of the entire Philpott project is $13,040,000.

Altogether the Corps of Engineers

(*Continued on page 40*)

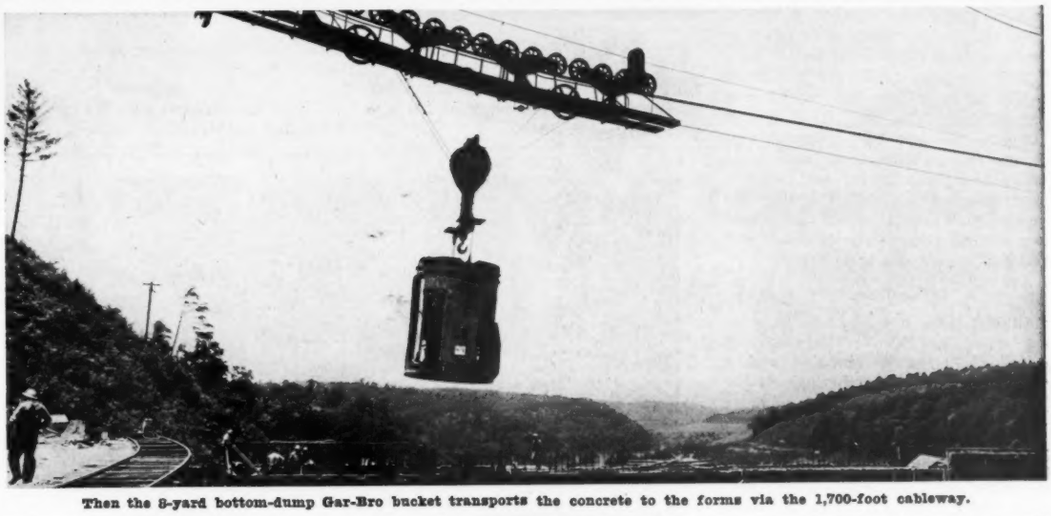
C. & E. M. Photos



The five sizes of aggregates for the concrete going into Philpott Dam are supplied by Lambert Bros., Inc., of Knoxville, Tenn. They are taken from Fort Trial Quarry and crushed in this plant. The diagram on the facing page shows the flow of materials at the quarry.

The head tower of the Washington Iron Works cableway system is fixed. It is 100 feet high and is secured with four guys. It is on the right or south bank of Smith River.

A Plymouth locomotive pushes the flatcar-mounted transfer hopper containing mixed concrete to dumping position under the cableway.



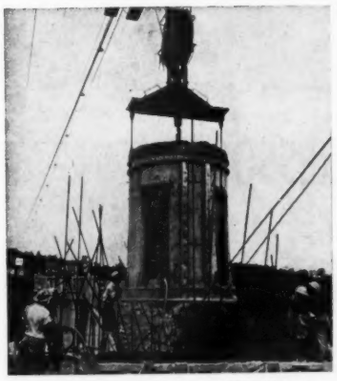
Then the 8-yard bottom-dump Gar-Bro bucket transports the concrete to the forms via the 1,700-foot cableway.

Aggregates From a Granite Quarry Nearby are Crushed and Screened From 6-Inch Maximum Down to Sand

• ALL aggregate for concrete going into Philpott Dam near Bassett, Va., is being supplied by Lambert Bros., Inc., of Knoxville, Tenn. Coarse and fine aggregate, from 6-inch maximum size down to sand, is taken from Fort Trial quarry, an 8-mile haul to the dam site. Approximately 610,000 tons of sand and crushed stone are required for the 325,000 cubic yards of concrete being placed in the gravity-type structure.

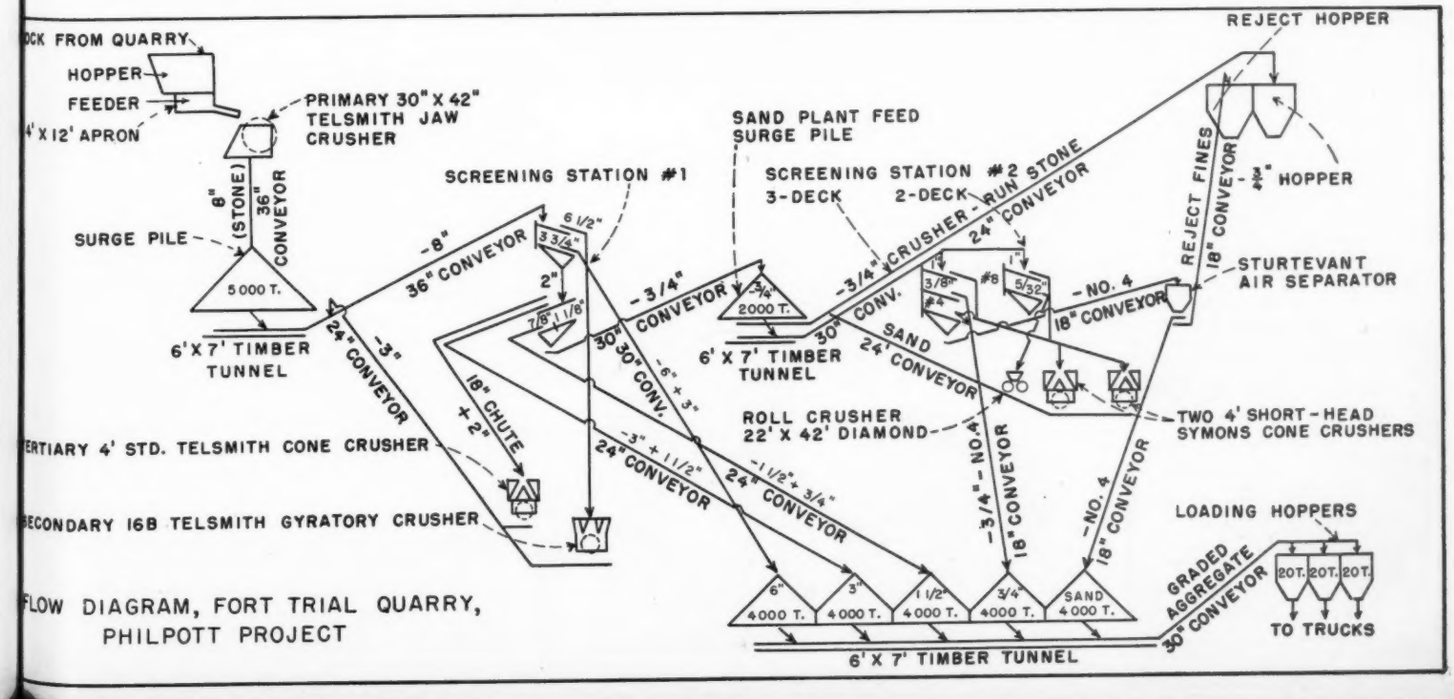
The quarry, located about a mile south of Bassett Forks, yields granite gneiss rock which is quarried, crushed, and screened into five sizes. They are: (1) cobbles (3-inch to 6-inch); (2) coarse aggregate (1½-inch to 3-inch); (3) medium aggregate (¾-inch to 1½-inch); (4) fine aggregate (No. 4 to ¾-inch); (5) sand (Minus No. 4). The quarry had been worked several years ago, but since then had remained inactive until the aggregate producer moved in to develop it for the Philpott project. Because of the thick stratum

(*Continued on page 46*)



The bucket empties into monolith 9.

A Jackson 2-man vibrator knocks down the pile of fresh concrete.



FLOW DIAGRAM, FORT TRIAL QUARRY, PHILPOTT PROJECT

Philpott Dam Contract Is Nearing Completion

(*Continued from page 38*)

has planned a system of 11 reservoirs for the Roanoke Basin, but only 2 are under construction—Buggs Island and Philpott. Buggs Island Dam is being built across the Roanoke River about 180 miles above its mouth in Albemarle Sound, North Carolina. Philpott Dam on the Smith River is 44 miles above its confluence with the Dan River, a tributary of the Roanoke. It is about 4 miles upstream from the village of Philpott, hence the name, and 7 miles upstream from Bassett, a furniture-making city that is always hard-hit when the Smith River is in flood.

During the 1937 flood, for instance, the river discharge reached a record 32,000 cfs in the month of October as compared with the average annual flow of 275 cfs. In 1932, the minimum weekly average flow on record was only 40 cfs. The 1937 flood caused extensive damage to industrial and commercial establishments and residences in cities, towns, and villages along the Smith River. About 3,500 workers in plants along the flood plain of the river were affected, and 1,550 had to evacuate their homes.

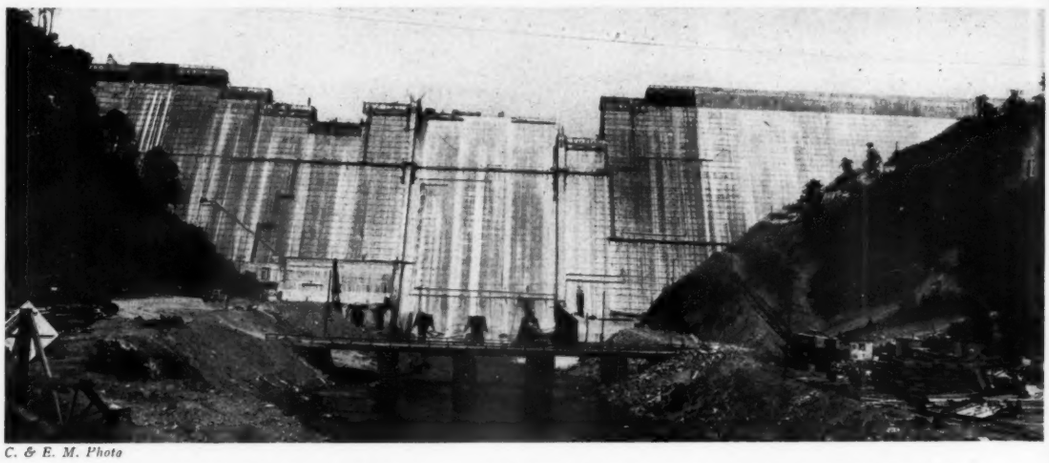
The Dam

Philpott Dam is a concrete gravity-type structure 892 feet long with a maximum height of 220 feet and a maximum thickness at the base of 174 feet. The centrally located ungated spillway section is 120 feet long, with its crest at elevation 985. It consists of three monoliths—10, 11, and 12—out of the total 22 in the dam, numbered from right bank to left bank. Each of the three spillway monoliths has a sluice near its base to control the release of water from the reservoir. The sluices are 5 feet 8 inches wide x 10 feet high, and the flow of water through them is controlled by hydraulically operated slide gates within the dam.

Two tunnels go through the dam. One, extending practically its entire length, provides access for inspection, grouting, and drainage; also access to chambers containing the operating equipment for the sluice gates. The other tunnel extends under the spillway, and provides access between the nonoverflow sections of the dam.

Monoliths 8 and 9, the 92-foot intake and powerhouse section of the dam, contain three penstocks or conduits for discharging water from the reservoir to the powerhouse, which will be located immediately downstream of the dam adjacent to the right bank. Two of the penstocks are 9 feet in diameter, each serving a main generator with a normal rating of 6,700 kw. The third penstock, 3 feet in diameter, serves a 600-kw station service generator. The power installation thus totals 14,000 kw.

The rest of the dam consists of two nonoverflow sections—monoliths 1 through 7 adjoining the right bank, and monoliths 13 through 22 adjoining the left bank, with the top at elevation 1,016. The axis of the dam is roughly north-south, the left bank at the site being the north side.



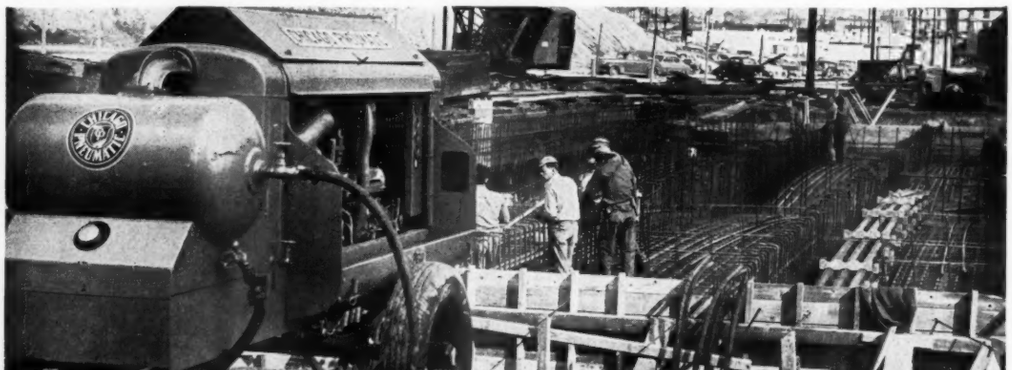
C. & E. M. Photo

This is the downstream face of Philpott Dam. Across Smith River in the foreground is the construction bridge.

The Reservoir

Above the Philpott site, the sparsely inhabited watershed has an area of 212 square miles. The reservoir at the top of the flood-control pool, elevation 998,

(*Continued on next page*)



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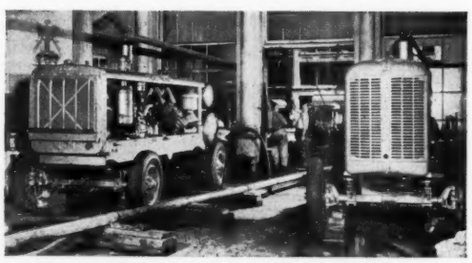

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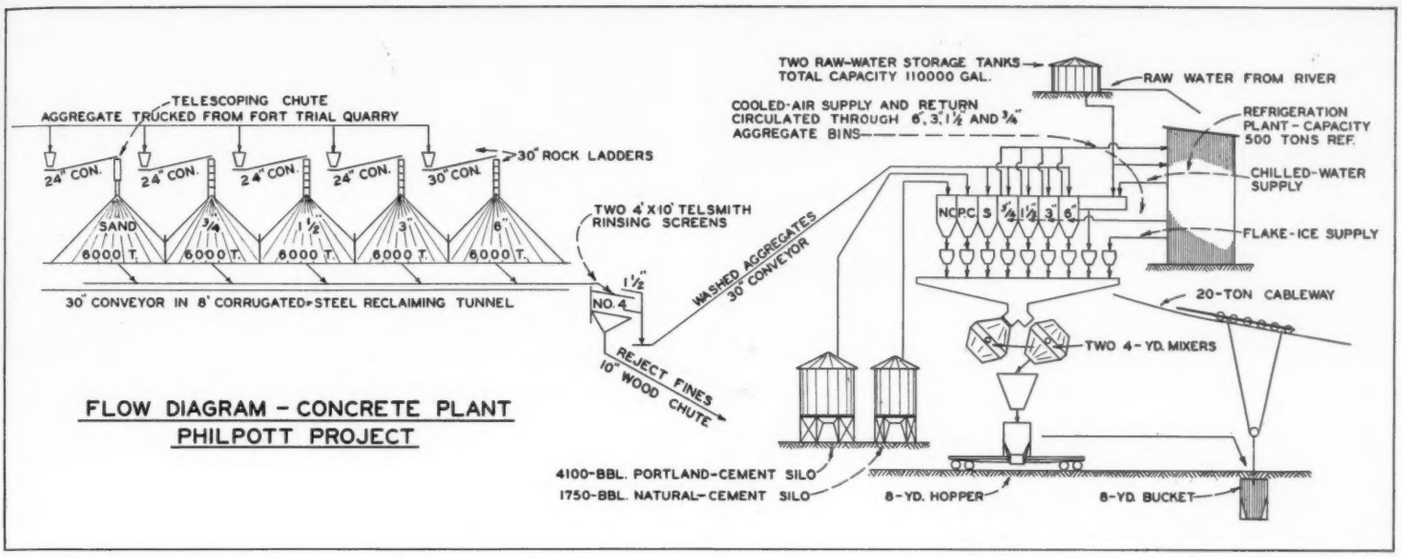

FLOW DIAGRAM – CONCRETE PLANT
PHILPOTT PROJECT

covers portions of Franklin, Patrick, and Henry Counties. It will cover an area of approximately 6.4 square miles with a total storage capacity of 250,000 acre-feet. It will be 17 miles long with a maximum width of one mile. Usually the reservoir surface will be between elevations 962 and 974 forming a lake with a surface area of 4 to 4½ square miles and about 100 miles of shore line.

The 82,400 acre-feet of storage space between elevations 998 and 974 is reserved exclusively for the control of floods. It represents the equivalent of 7.3 inches of runoff from the watershed above the dam, and is sufficient to control a flood about 2½ times greater than the 1937 flood. Normally this space will be left empty.

Storage for flood control below 985, spillway crest elevation, is 34,100 acre-feet. Storage for power and low-water regulation is 111,100 acre-feet, while dead storage is 56,300 acre-feet. The maximum regulated discharge for a flood comparable to that of 1937 is 7,000 cfs compared with a natural discharge of 32,000 cfs. The no-damage discharge at Bassett, Va., is 20,000 cfs. A flood about two and a half times as large as that of 1937 could be regulated to 20,000 cfs. Although a flood of such magnitude would be extremely rare, larger floods are considered possible. The average flow for power will be 263 cfs.

Four-Year Job

Construction got under way at the Philpott project in March, 1948, with preliminary contracts for an access road, and excavation for the foundation of the dam abutments along the river banks. Work on the dam itself began in July, 1949, after the Corps of Engineers, Norfolk District, awarded a contract on a low bid of $6,493,526 from a joint venture of three firms—Bates

(Continued on next page)

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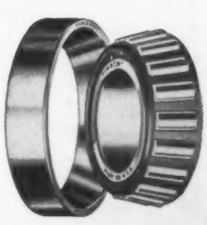

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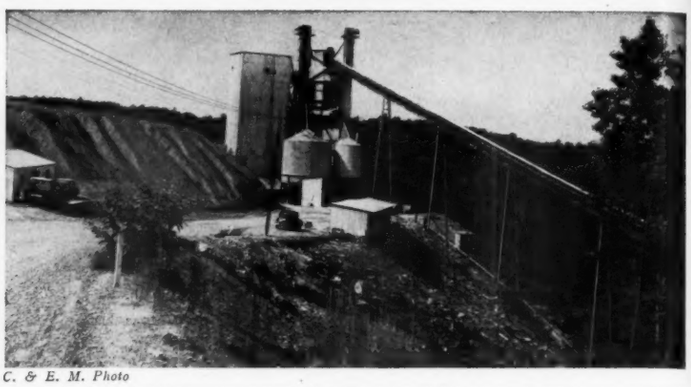
C. & E. M. Photo

Here are the aggregate storage piles that feed the concrete plant across the ravine.



C. & E. M. Photo

And here is the C. S. Johnson concrete-batching plant with its aluminum-top conveyor.

Philpott Dam Contract Is Nearing Completion

(Continued on next page)

& Rogers Construction Corp. of Chicago; Morrison-Knudsen Co., Inc., of Boise, Idaho; and Peter Kiewit Sons' Co. of Omaha, Nebr. Bates & Rogers is handling the construction and supplying the supervisory personnel.

Preliminary work of the prime contractor consisted of installing aggregate storage facilities and a concrete batching and mixing plant, and erecting a cableway system for placing the 325,000 cubic yards of concrete which will go into the dam. In October, 1949, construction started on the earth-fill timber cofferdam at the left bank of the river for the first-stage diversion. This cofferdam enclosed the three spillway monoliths 10, 11, and 12 containing the outlet sluices, and the nonoverflow section with monoliths 12 through 22.

Excavation proceeded for the dam foundation inside the 12-foot-wide cofferdam through the fall and winter of 1949-1950, and on March 13, 1950, the first bucket of concrete was placed in monolith 10. The river, meanwhile, diverted over to the right bank, followed a course where monoliths 8 and 9 would eventually rise. By August, 1950, monoliths 10, 11, and 12 had been built to a height including the sluices, thus permitting the diversion of the river through these openings. For this second-stage diversion, wings of timber cribbing were built back from the original cofferdam to the right bank of the river, both upstream and downstream of the dam.

A third-stage diversion was effected in February, 1951, when a bulkhead was built in the outlet end of the sluice at monolith 12. Through this bulkhead a 5-foot-diameter corrugated-metal pipe was carried downstream on timber cribbing to discharge beyond the end of the stilling basin. With the gates closed in the sluices at monoliths 10 and 11, the flow of the river was carried in the 5-foot pipe to permit excavation and concrete placing in the dry at the stilling basin. The apron of the stilling basin is 186 feet long x 120 feet wide, and is divided into blocks averaging 35 x 30 feet with a minimum thickness of 5 feet. At the

(Continued on next page)

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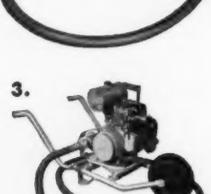

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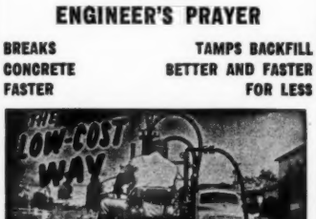

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sides are concrete training walls with their tops at elevation 827 to direct the discharged water. A construction bridge, supported on timber-cribbing piers, was built across the river downstream of the stilling basin.

Aggregate Storage

As the five sizes of granite gneiss aggregate—manufactured sand, ¾-inch, 1½-inch, 3-inch, and 6-inch—are delivered by truck from Fort Trial quarry (see article on page 38), they are dumped into separate receiving hoppers on the right bank downstream of the dam. The sand and the ¾-inch, 1½-inch, and 3-inch coarse aggregate are transported to their respective storage piles by separate 24-inch belt conveyors, with a 30-inch conveyor carrying the 6-inch aggregate. A vertical telescoping steel chute, extending from the outfall end of the sand conveyor to the sand storage pile, is used to prevent wind losses and segregation. Individual 30-inch rock ladders are set up at each of the coarse-aggregate storage piles to reduce breakage. Each pile has a capacity of 6,000 tons. Barber-Greene conveyors are used throughout.

From the bottom of the individual piles, aggregates are loaded by gravity through jaw gates onto a 30-inch belt conveyor running in an 8-foot-diameter Armco corrugated-steel reclaiming tunnel, 448 feet long, and are transported to a rinsing unit. The latter consists of two Telsmith 4 x 10-foot double-deck screens, 1½-inch top and No. 4 bottom, with water sprays in the feed chute and on the top deck of the screens.

Sand is by-passed around the screens without washing, while the coarse aggregate goes over the top screens and is rinsed at the same time. Reject fines that are washed out of the aggregates through the screens are transported by a 10-inch wood chute to a waste pile. The washed aggregate and the sand are carried by a 30-inch conveyor, 600 feet long, to individual storage bins in the batching and mixing plant having a total capacity of 500 tons. This last conveyor has a maximum angle of 17 degrees in passing over a deep ravine between screens and plant. It has an aluminum top to shield the aggregate from both heat and rain.

Batching and Mixing Concrete

The batching plant is a C. S. Johnson unit that includes a 4,100-barrel portland-cement silo and a 1,750-barrel natural-cement silo. Portland cement is supplied by Lehigh from its Fordwick, Va., plant, while the Louisville Cement Co.'s Speed, Ind., plant furnishes the natural cement. Both are shipped in bulk cars to a siding of the Norfolk & Western Railroad at South Bassett, where the portland is unloaded into a 1,750-barrel bin and the natural into a 750-barrel bin. Three covered trucks haul the cement from the bins at the siding to the plant, where it is dumped into hoppers, and fed either to the respective silos or to the bins at the top of the plant by means of a separate enclosed horizontal screw conveyor and a vertical bucket elevator.

Water for the project is pumped from a settling basin at river level upstream of the dam by three Fairbanks vertical turbine pumps, rated at 500 gpm with a 350-foot head. It is pumped through a 10-inch line to the top of a hill where it is stored in a 75,000-gallon steel tank located above the grade of the batching and mixing plant.

From this tank, one 6-inch water line runs out to the dam to supply water for washing forms, cutting back concrete at the tops of the lifts, and for curing. Another 6-inch line supplies the concrete plant both for the mix and refrigeration. Waste condensing water from the refrigerator plant is piped to a 35,000-gallon steel storage tank next to the mixing plant for miscellaneous additional use on the project.

Cooling the Concrete

Three different steps are taken to reduce the temperature of the concrete to between 40 and 62 degrees when it is placed (it averages around 50 degrees): (1) chilling the mixing water down to 35 degrees, (2) substituting flake ice for part of the mixing water, and (3) blowing cool air over the coarse aggregate in the storage bins.

The insulated refrigeration plant next to the batching and mixing plant is a York-equipped unit with four ammonia compressors having a total capacity of 500 tons of refrigeration. At the top of the plant are two ice machines that turn out 30 tons of flake ice in 24 hours. As the ammonia-chilled drums revolve under a water spray, the thin film of ice that forms is cut off the drums in flakes, and chuted down to a 30-ton storage room on the level below. From there the ice is conveyed to the batching plant, where it is added to the batch in the collecting hopper.

Water for the mix is cooled to 35 degrees at a rate of 35 gpm in a single cooling unit, and piped into an 800-gallon mixing-water storage tank in the batching plant.

Cooled air is blown past cooling coils in the fan room by an American 67,000-cfm blower fan, and through two 48-inch-diameter ducts passing through each of the coarse-aggregate storage bins in the batching and mixing plant. The air is returned to the fan room through a single 60-inch-diameter return duct. The sand is not air-cooled.

The Mix

On the level below the storage bins is the batcher floor and below this floor are two Koehring 4-yard Concentric

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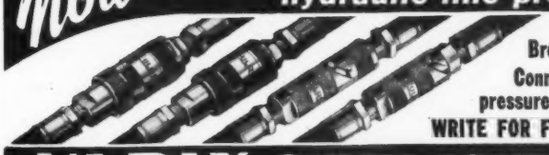

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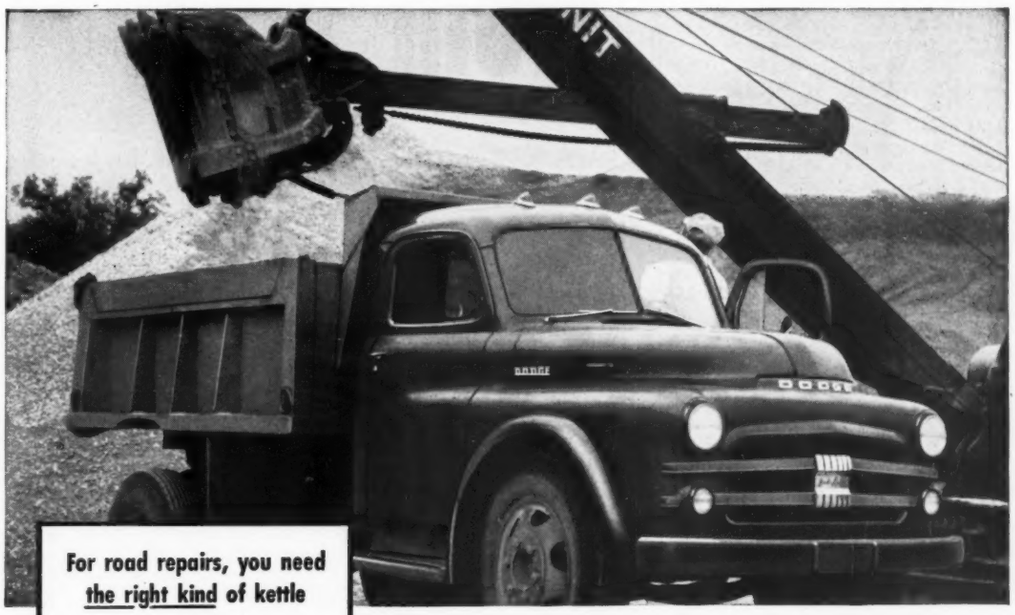

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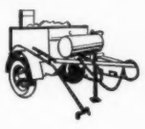

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How Dodge trucks are *"Job-Rated"* for the construction business

A Dodge *"Job-Rated"* truck is engineered *at the factory* to fit a specific job . . . save you money . . . last longer.

Every unit from engine to rear axle is *"Job-Rated"*—factory-engineered to haul a specific load over the roads you travel and at the speeds you require.

Every unit that SUPPORTS the load—frame, axles, springs, wheels, tires, and others—is engineered right to provide the strength and capacity needed.

Every unit that MOVES the load—engine, clutch, transmission, propeller shaft, rear axle, and others—is engineered right to meet a particular operating condition.

"Job-Rated" TRUCKS DO THE MOST FOR YOU

Philpott Dam Contract Is Nearing Completion

(Continued from preceding page)

Zone tilt-type mixers where 4-yard batches are mixed 2½ minutes. All weighing of cements, aggregates, water, and ice is automatically controlled and recorded on sealed-in charts. The maximum output is approximately 1,300 yards per 8-hour shift.

Vinsol resin air-entraining agent is interground with the natural cement. If more air entrainment is needed to meet the specification requirements of from 3 to 6 per cent, additional Vinsol resin is added to the batch.

About 70 per cent of the concrete in the dam is a lean mix (2½ bags of cement per cubic yard), placed in the interior of the structure. The lean mix is not only a saving on cement, but also helps to hold down the heat of hydration. The top-size aggregate, 6-inch, is used, and the ratio of portland to natural cement is 77 to 23. The weights of a typical interior mix yielding 4 yards of concrete are given in the following tabulation:

Cobbles (3 to 6-inch)	4,437 lbs.
Coarse (1½ to 3-inch)	3,170 lbs.
Medium (¾ to 1½-inch)	2,377 lbs.
Fine (No. 4 to ¾-inch)	2,536 lbs.
Sand (minus No. 4)	3,328 lbs.
Cement (portland)	724 lbs.
Cement (natural)	216 lbs.
Water	686 lbs.
Total batch weight	17,474 lbs.

Saturated-surface dry weights are used, and the calculated unit weight of the concrete is 161.8 pounds per cubic foot. The water-cement ratio by weight is 0.73, with 172 pounds of water for every cubic yard of concrete.

Placing the Concrete

From the 500-yard plant the mixed concrete is dumped into an 8-yard discharge hopper, and then into an 8-yard transfer hopper permanently mounted on a standard-gage railroad flatcar. The transfer car is shifted approximately 200 feet up a transfer track by a Plymouth 8-ton gas-driven locomotive to dumping position under the cableway, which carries an 8-yard Gar-Bro bucket. The concrete is discharged into this bottom-dump bucket and transported to the forms by the cableway.

Concrete is delivered to all parts of the dam by a Washington Iron Works cableway system consisting of a fixed head tower, movable tail tower, and connecting cables for a 1,700-foot span. The head tower on the right bank is 100 feet high, secured with four guys, and with an elevation of 1,200 at the pins near the top. On the left bank the 41-foot 6-inch tail tower travels on two sets of standard-gage tracks laid on 28-foot centers. It moves on a 525-foot arc, propelled by a 100-hp electric motor, so that the concrete bucket may be discharged over any point in the dam. A 428-ton concrete counterweight prevents the tail tower from overturning under the stress to which it is subjected. The elevation of the cable track at the tail tower is 1,073.

The 16-wheel cableway carriage rides on a 3-inch armored cable, and is designed to handle a safe working load of 20 tons. Besides transporting concrete, it also handles major pieces of equipment. It is electrically operated throughout, and all controls are located at the head tower. The operator and the signalman overlooking the monolith cannot see each other, but are in telephone communication. A Westinghouse 500-hp motor operates the head tower and its functions.

Cantilever Forms

Noble full cantilever forms are used on the dam. The lagging is either yellow pine or Douglas fir 2-inch tongue and groove, with a pair of 7-inch channel backstays for each 10-foot panel. These cantilever arms extend 4½ feet below the lagging, and are secured to the previous lift of concrete with Richmond insert bolts. The height of the lagging accommodates a 5-foot lift of concrete. There are four 10-foot panels to a face section of a monolith, and they are all raised together by the cableway.

In a 5-foot lift of concrete there are usually four layers. As the air-operated bottom-dump buckets discharge the mix, the concrete is vibrated either with Chicago Pneumatic or Jackson electric 2-man vibrators. Compressed air for the project is supplied by three Ingersoll-Rand compressors—two electric-driven compressors at 800 cfm each, and a 500-cfm diesel-driven unit. A 6-inch line distributes air from the receiver out to the dam.

The installed capacity of electric-powered construction equipment, such as the cableway, batching and mixing plant, refrigeration plant, aggregate conveyors, pumps, etc., requires more than 2,000 horsepower. The Appalachian Electric Power Co. serves the project through a transmission line and substation at the site.

About 3 to 6 hours after a lift of concrete is placed, the surface is cut back with an air-water jet at 100-pound pressure. The face of the concrete monolith is cured with water for 14 days, while the unexposed surfaces and the bulkheads are cured with Aquabar and Tru-Care membrane curing compounds.

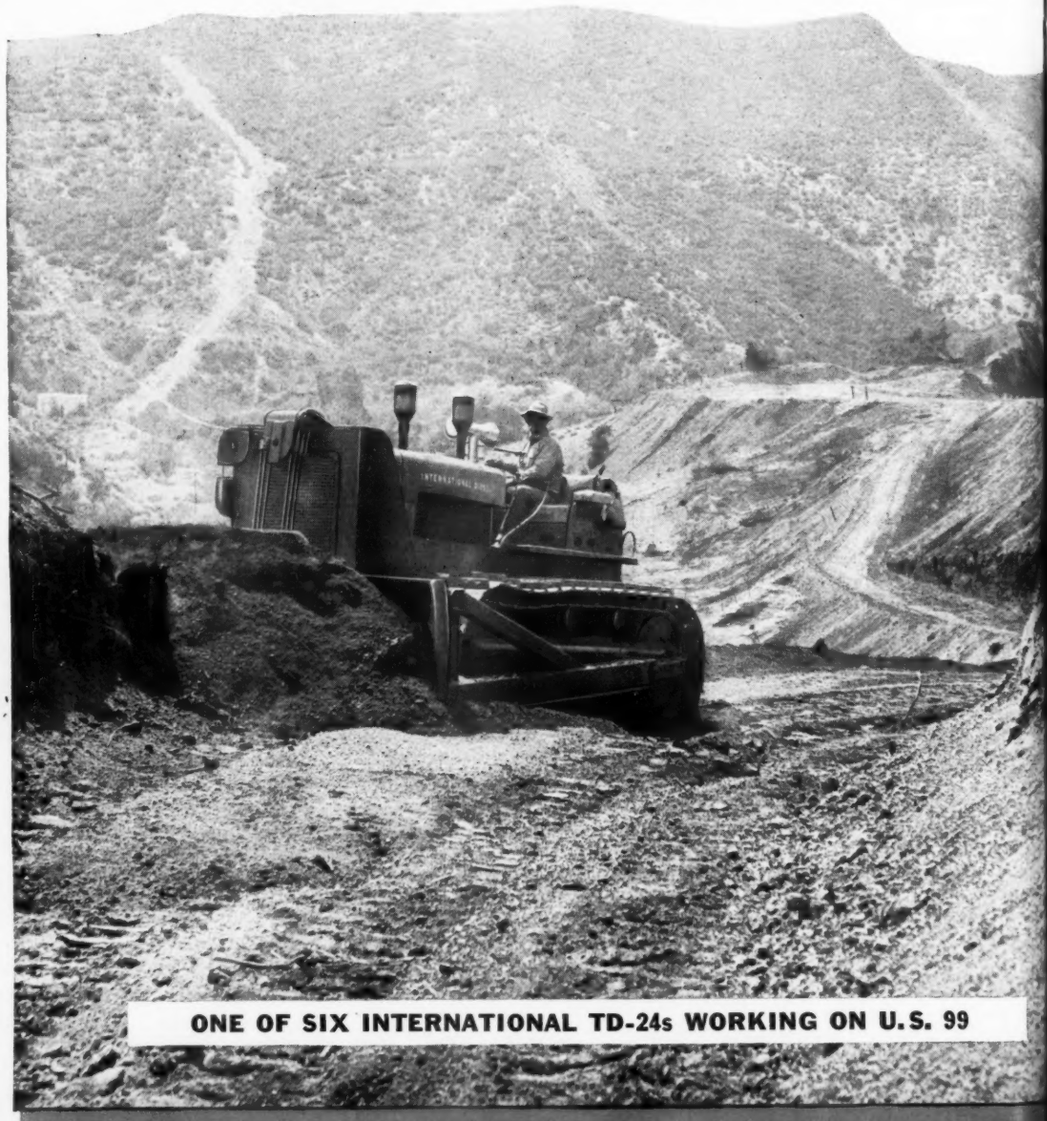
Vacuum Concrete

Vacuum concrete is used at the unformed surfaces of the spillway and for the apron blocks of the stilling basin. The necessary equipment is leased from Vacuum Concrete, Inc., of Philadelphia on a royalty basis, with the contractor doing the work with his own forces.

To avoid higher temperatures during the concreting operations, the placing is usually done on the 4 p. m. to midnight shift, or the midnight to 8 a. m. shift. Formwork is generally left to the day shift. The dam itself is expected to be completed by the end of the year, but the powerhouse—to be built under a separate contract—will not be finished until next year.

(Concluded on next page)

From Boulders



ONE OF SIX INTERNATIONAL TD-24s WORKING ON U.S. 99

Quantities and Personnel

The major items in the dam contract include the following:

Concrete	325,000 cu. yds.
Excavation	110,000 cu. yds.
Foundation drilling	26,000 lin. ft.
Steel and miscellaneous metal	1,000 tons

The Bates & Rogers-Morrison-Knudsen-Kiewit joint venture employed an average force of 350 at the peak of operations. Key personnel includes L. J. Bullen, Vice President; S. E. Winks, Project Manager; W. C. L. Jones, Project Engineer; John Ransdell, General Superintendent.

For the Corps of Engineers, William D. Nowlin is Resident Engineer, Leo Q. Frank is Assistant Resident Engineer. The Norfolk District is headed by Col. William F. Powers, District Engineer. E. K. Jackson is Chief, Construction Division, and J. H. Coster is Chief, Civil Construction Branch.

Heavy-Duty Air-Motor Jack

A complete line of heavy-duty air-motor jacks is described in a catalog prepared by The Joyce-Cridland Co., 2027 E. First St., Dayton, Ohio. These lifting units are available in 5 sizes and capacities with heavy-duty rotary air-powered motors. Various models are available with capacities ranging from 50 to 500 tons and rises of 13¾ to 30 inches.

The catalog states that the compressed air replaces manpower and saves approximately nine-tenths of the time required for hand jacking. Automatic shutoffs increase safety. The jacks are lowered by reversing the motor. Other features include Alemite lubrication, one-man control, complete portability, aid speed of operation.

This literature may be obtained from the company by requesting Bulletin 191J, or by using the Request Card at page 16. Circle No. 914.

Gumout Appoints Benasich

Albert A. Benasich has been appointed a sales-service representative in the Gumout Division of Pennsylvania Refining Co., Cleveland, Ohio. He will use his extensive knowledge of the automotive market in the firm's new market development program for Gumout forced-flow carburetor cleaning.

to Boulevard

A. Teichert & Sons tackle huge highway job on U. S. 99 in California mountains

Fifty miles north of Los Angeles, A. Teichert & Sons are changing the face of California to modernize the main road to San Francisco.

They're digging into the rough, rocky hills with six Big Red TD-24s . . . charging in with International power to move over a million yards of boulder-filled earth—doze out cuts down to 350 feet deep—reroute a creek channel to eliminate present bridges—turn today's three-lane U. S. Highway 99 into a four-lane traffic-separated superhighway.

Teichert chooses TD-24s for the job because they're the Champs for this grueling, heavy-duty work. Here's why:

TD-24 Power—148 maximum horsepower at the drawbar, more than any other crawler on the market. Moves more dirt per hour.

TD-24 Speed—8 forward speeds, 8 reverse. Moves loads faster, gets out and gets in again faster for a faster work cycle.

TD-24 Operation—Synchromesh transmission, you shift "on-the-go." And you go up or down one speed without declutching.

TD-24 Steering—Fingertip steering for pivot turns, feathered turns, turns with power on both tracks.

TD-24 Starting—Push-button starting in any weather.

Ask your International Industrial Distributor for details on the TD-24. Consider his on-the-job service and complete shop facilities, at your call through the years ahead. Get the whole low-down! You'll be a TD-24 man from then on in!

International Harvester Company, Chicago 1, Ill.

INTERNATIONAL — INTERNATIONAL HARVESTER — POWER THAT PAYS

1,200,000 YARDS TO MOVE—and one of A. Teichert's International TD-24s gets at it. Among crawler tractors, the Big Red TD-24 is the Champ, with more power and speed to move more paydirt per day.

AGC Views Controls

The Governing and Advisory Boards of the Associated General Contractors of America held their mid-year meeting at the Edgewater Beach Hotel in Chicago during September. More than 300 members attended the sessions. The prime topic was controls and the uncertainties arising from them.

In his opening address, President Glen W. Maxon criticized the Controlled Materials Plan for depriving contractors of their ability to give public bodies and private investors any reasonable assurance that projects can be completed on schedule and at estimated costs.

The plan calls for allotments of controlled materials to the various construction programs, after which government claimant agencies make allotments to individual construction projects. With thousands of such projects already under way and hundreds of others needed for national defense, only good administration of such a plan, Mr. Maxon pointed out, can avert "a terrible mess" in the construction industry. It can well be that some projects already in progress will come to a halt before completion, thus causing waste and unnecessary expense. A study of fourth-quarter structural-steel allotments shows that only carefully screened military construction and aluminum-expansion programs get 100 per cent of their requirements, while general commercial construction is allotted only 11 per cent.

Mr. Maxon expressed the opinion that Government and general contractors must work together to complete essential projects with the minimum of delay and expense. He emphasized that it is the duty of members, through the AGC, to point out any serious effects of controls upon their business and their clients, and to report to the Association on local effects as soon as possible.

CMP was thoroughly reviewed before the Boards and the divisional round-table meetings by C. S. Embrey of the AGC national staff. H. C. Turner, Jr., Chairman of the Building Contractors' Division, who has been serving on industry advisory committees to the National Production Authority and the Office of Price Stabilization, expressed the opinion that essential projects should "fare very well" under CMP, while others will experience slowdowns.

The officers nominated by the Boards for 1952 are: President—Arthur S. Horner, A. S. Horner Construction Co., Denver, Colo.; Vice President—C. P. Street, McDevitt & Street Co., Charlotte, N. C. The 1952 Annual Convention will be held at the Statler Hotel, Detroit, Mich., February 25-28.

According to Managing Director H. E. Foreman, the AGC is now in its strongest position in history in membership, finances, and prestige. Membership stands at more than 6,000, representing firms performing all types of contract construction throughout the United States and Alaska.

Bulletin on Excavators

A bulletin on the Little Giant convertible excavator has been prepared by Little Giant Crane & Shovel, Inc., E. 16th and Howard Drive, Des Moines 13, Iowa. This unit may be equipped as crane, dragline, clamshell, shovel, trench hoe, electric magnet, or pile driver; and may be obtained with truck or crawler mountings.

The bulletin illustrates and describes all salient features of the excavator, including clutches, drum assembly, upper machine, safe boom hoist, and swing assembly. Detailed specifications are given for both the ⅜ and the ½-yard models.

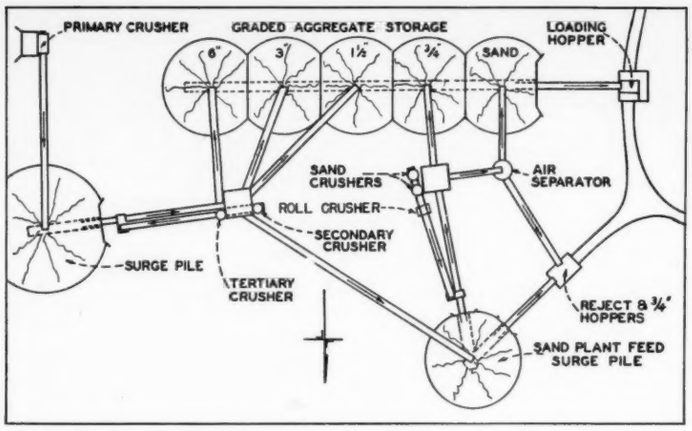
This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 901.

Aggregates for Dam Are Quarried Nearby

(*Continued from preceding page*)

of overburden above the rock, the development of the quarry area was vertical rather than horizontal, with the quarry face ranging in height from 100 to 150 feet.

Wagon drills were used to some extent, but most of the drilling for blast holes was done with an Ingersoll-Rand Quarry Master that drilled 6-inch-diameter holes into the hard rock. Average depth of holes was 35 feet, as the quarry floor was lowered in lifts of comparable thickness. Atlas, Du Pont, and Hercules dynamite was used in charging the holes. A 2-yard and a 1½-yard shovel loaded the blasted rock into Mack 12-yard dump trucks for hauling to the receiving hopper at the crushing plant, less than 500 feet away.



The layout of the aggregate plant that Lambert Bros. set up for Philpott Dam.

Primary Crusher

Beneath the hopper a 4 x 12-foot apron feeder moves the quarry output along to a Telsmith 30 x 42-inch primary jaw crusher having a capacity of 300 tons an hour. It is driven by a Caterpillar 145-hp diesel engine, and is set to produce minus-8-inch rock. From the primary crusher the rock moves up a 36-inch conveyor to discharge onto a primary storage surge pile of 5,000-ton capacity. Underneath the pile is a 6 x 7-foot timber tunnel containing a 48-inch vibrating feeder that puts the rock on another 36-inch conveyor discharging into screening station No. 1.

Here the material spills out over a pair of Telsmith 5 x 12-foot double-deck screens. One unit has a 6½-inch top screen and a 3¾-inch bottom screen, while the other has a 2-inch top and a dual bottom screen, 1⅛ inches and ⅞ inch. All rock retained on the 6½-inch top screen of the first unit passes along to a Telsmith 16B secondary gyratory crusher driven by a Caterpillar 150-hp diesel engine. The minus-3-inch rock, produced by the secondary crusher, falls onto a 24-inch conveyor that takes it back to the 36-inch conveyor for delivery again to the 6½-inch top screen.

Rock that passes this 6½-inch screen, but is retained on the 3¾-inch screen beneath it, is taken by a 30-inch conveyor to the 6-inch storage pile holding 4,000 tons. Rock passing the 3¾-inch screen falls onto the screens of the second unit at station No. 1. What is retained on the 2-inch top screen of this unit is handled in two ways—either it is moved along on a 24-inch conveyor to the 3-inch storage pile having a capacity of 4,000 tons, or it is diverted by an 18-inch chute to a Telsmith tertiary 4-foot standard cone crusher, driven by a 125-hp electric motor.

From this tertiary crusher, the minus-¾-inch material (according to the crusher setting) is sent back to the 6½-inch top screen via the 24-inch and 36-inch conveyor belts. Again at the second unit of the screening station, rock passing the 2-inch, and retained on the dual 1⅛-inch and ⅞-inch screen, goes by way of a 24-inch conveyor to the 1½-inch storage pile of 4,000-ton capacity. Rock passing the dual 1⅛-inch and ⅞-inch screen drops onto a 30-inch conveyor for transportation to the sand-plant feed surge pile that holds 2,000 tons of minus-¾-inch material.

Screening Station No. 2

Underneath this pile are two 6 x 7-foot timber reclaiming tunnels with a jaw gate in the roof of each for admitting the material into the tunnels. A 24-inch conveyor in one tunnel transports the excess of minus-¾-inch crusher-run stone to a hopper as required. From the other tunnel a 30-inch conveyor moves the material from the sand-plant feed surge pile to screening station No. 2.

This second station contains two Telsmith 4 x 12-foot screen units—a triple-decker and a double-decker. Top, middle, and bottom screens in the first unit are 1-inch, ⅜-inch, and No. 4 respectively. In the double-deck unit, the top screen is 1-inch and the bottom is a dual 5/32-inch and No. 8 screen. Material that is retained on the top 1-inch screens of each unit goes to two Symons 4-foot short-head sand cone crushers. Each sand crusher is driven by a 150-hp electric motor.

At the triple-deck unit, material that passes the 1-inch but is retained on the ⅜-inch screen is put on an 18-inch

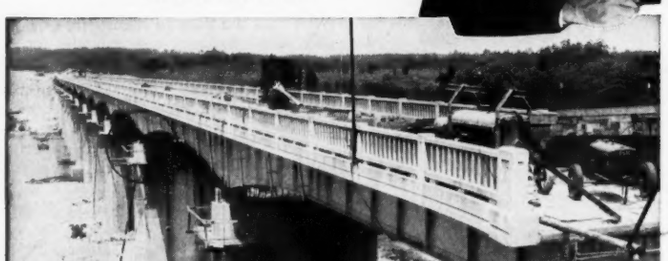
(*Concluded on next page*)

JOYCE JACKS Chosen for Safety

BY E. W. LaPLANTE COMPANY

"We demand an exceptionally high factor of safety in all our moving operations . . . that's why we selected Joyce Speed Powered Air Jacks to move this 1,500 foot, 4,000 ton Savannah River Bridge 17 feet straight up! Sixteen Joyce Air Jacks controlled by five men, easily completed the project in two months with no injuries or damages. Traffic continued at all times."

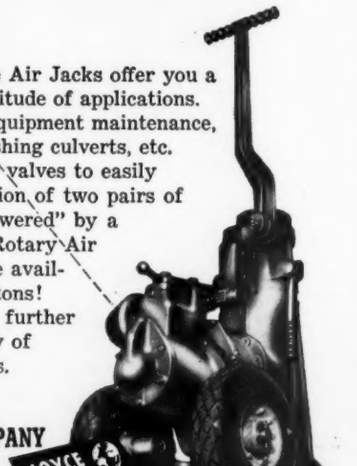
KENNETH F. ADAIR, pres. and gen. manager
E. W. LaPLANTE COMPANY
MOVING ENGINEERS



VERSATILE JOYCE AIR JACKS SAVE YOU MANPOWER!

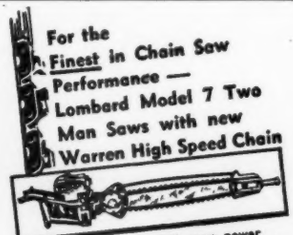
Joyce Air Jacks offer you a multitude of applications, ranging from heaviest equipment maintenance, and moving operations to pushing culverts, etc. One man actuates "Y" valves to easily control the speedy operation of two pairs of these jacks. "Speed Powered" by a heavy duty Ingersoll-Rand Rotary Air Motor, Joyce Air Jacks are available in 50, 75, and 100 tons! Reliability of factory service further guarantees the dependability of these remarkable air jacks.

For complete information, write for bulletin 191-J today!



THE JOYCE-CRIDLAND COMPANY
DAYTON, OHIO

Joyce builds a complete line of ratchet jacks, screw jacks, hydraulic jacks, shoring jacks, and trench braces—3 to 100 ton capacities.



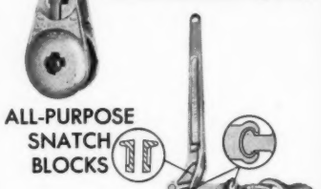
For the Finest in Chain Saw Performance — Lombard Model 7 Two Man Saws with new Warren High Speed Chain

Dept. F — 12% more power 10 lbs. lighter weight

LOMBARD GOVERNOR CORP.
ASHLAND, MASSACHUSETTS

LEBUS GUARANTEED TOOLS

TOOLS YOU CAN DEPEND ON!



ALL-PURPOSE SNATCH BLOCKS

LEBUS "BULL DOG" LOAD BINDER

CONNECTING MISSING LINK

TAIL CHAINS

INDUSTRIAL DOUBLE & SINGLE HOOKS

All LeBus Tools are designed by capable engineers and drop forged from alloy and high carbon steels in one of the most modern die-making and forging plants in the country. These tools are given a full pull strength test before they leave the plant, which guarantees these units against failure in the most rugged service.

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LEBUS WRITE FOR COMPLETE LITERATURE

LEBUS ROTARY TOOL WORKS
INCORPORATED
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LONGVIEW, TEXAS

C. & E. M. Photo

A Mack truck dumps quarry rock into a Telsmith primary crusher, powered by a Caterpillar engine.

conveyor for transporting to the ¾-inch storage pile, 4,000-ton capacity. At the double-deck unit, material that passes the 1-inch but is retained on the dual 5/32-inch and No. 8 screen is fed either to the sand crushers or to a Diamond 22 x 42-inch roll crusher as required. The roll crusher is powered by a 125-hp electric motor.

Air Separator

Again at the triple-deck unit, material passing the ⅜ and retained on the No. 4 screen goes either to the sand crushers, or onto an 18-inch conveyor that discharges over the ¾-inch storage pile. Material that passes the No. 4 screen of the triple-deck unit, and the dual 5/32-inch and No. 8 screen of the double-deck unit, goes over an 18-inch conveyor to a Sturtevant 10-foot air separator. Material that passes through the two sand crushers and the roll crusher drops onto a 24-inch conveyor. From there it is fed back to the 30-inch conveyor running between the sand-plant feed surge pile and screening station No. 2 for recirculation.

From the air separator, acceptable material is transported on an 18-inch conveyor to the sand storage pile having a capacity of 4,000 tons. The rejected fines move over another 18-inch conveyor to the reject hopper.

Underneath the five storage piles of graded aggregate, totaling 20,000 tons, is a 6 x 7-foot timber reclaiming tunnel containing a 30-inch conveyor. Material from any stockpile is discharged onto this conveyor for transporting through the tunnel and then up to a 3-compartment loading hopper. Each compartment holds 20 tons. Trucks for hauling the aggregate to the dam site are filled by driving under the loading hopper. Peak production at the plant is 300 tons per hour; operating personnel totals 30.

The Shinall Trucking Co. of Cartersville, Ga., is hauling the aggregate 8 miles to the dam site in a fleet of 18 trucks averaging 10 to 12 tons a load. At the dam the material is unloaded into hoppers and raised by conveyors to the aggregate storage piles.

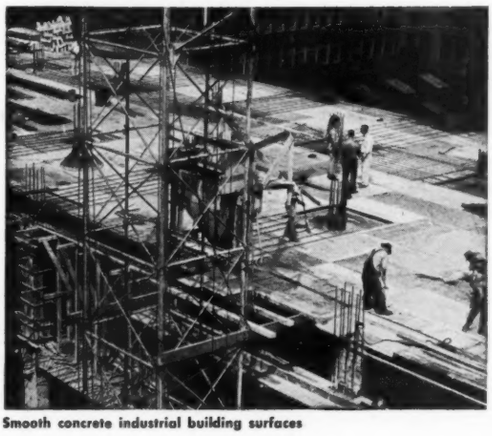
Why Not Some Publicity For Contractor Personnel?

A 75-year-old construction firm broke with tradition this fall. It issued a publicity booklet in which company supervisory personnel, not equipment or financial strength, held the spotlight.

Booth & Flinn Co., Pittsburgh, Pa., believes that its foremost asset is the men on its staff. Equipment, financial strength, reputation, and tradition would not be worth much, it says, without the men who have the know-how. The brochure "Men With Construction Know-How" carries biographies and large portrait photographs of the company's 16 top superintendents and foremen. It explains each man's construction specialties and experience, and pictures one big project on which he has been engaged.

In the past, construction firms have been reluctant to boast about their organizations for fear of competitor "stealing". But Booth & Flinn now stakes its sale story on its staff.

Clean, smooth beams and bridge piers



Smooth concrete industrial building surfaces

formfilm

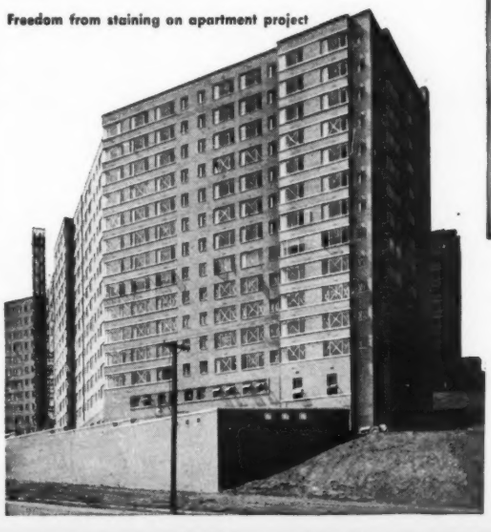
Protective Coating for Plywood Forms

All over America contractors report that Formfilm is the answer for the protective coating of plywood forms. Formfilm eliminates all oil staining and sharply reduces rubbing costs.

Advantages of Formfilm

Increases speed of form handling
Increases use of forms without recoating
Increases life of forms—no grain raising
Eliminates all disadvantages of oil or oil deposits on concrete.
Cleaner, smoother surfaces at lower cost

Freedom from staining on apartment project



horn

A. C. HORN COMPANY, INC.

MANUFACTURERS OF MATERIALS FOR BUILDING MAINTENANCE AND CONSTRUCTION
10TH STREET & 44TH AVENUE, LONG ISLAND CITY 1, N. Y.
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SUBSIDIARY OF SUN CHEMICAL CORPORATION

HORN PRODUCT

GENTLEMEN: CE-51
Please send complete data on FORMFILM

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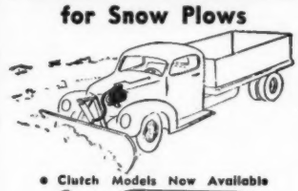
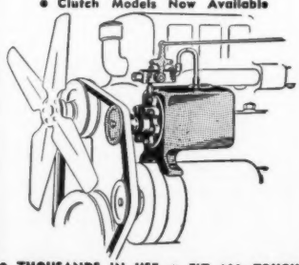
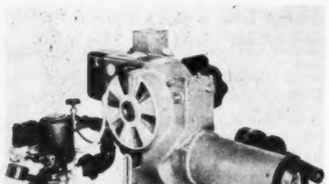
POWER HYDRAULICS
for Snow Plows



• Clutch Models Now Available



• THOUSANDS IN USE • FIT ALL TRUCKS
• FAN BELT OR ELECTRICALLY DRIVEN MODELS
• Write Hydraulic Division
MONARCH ROAD MACH. CO.
323 N. Front Ave., Grand Rapids 4, Michigan



The Hev-E combination oil and gas burner comes in 5 sizes. Capacity range is from 720,000 maximum Btu to 8,700,000 maximum Btu.

Oil and Gas Burner

A new line of five combination oil and gas burners has been introduced by Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis. They burn a maximum of from 720,000 Btu of gas in the AMG-2 size to 8,700,000 Btu in the AMG-7 size. The changeover from gas to oil is quick for all models, the company says.

A forced-air draft system in the Hev-E burners provides a single blower fan for all air for combustion, designed to give control over the fire under all atmospheric conditions. The burners can be regulated to burn the proper amount of gas or oil for a particular installation. On all burners, low-fire start is accomplished with either gas or oil. On the two larger sizes, the AMG-5 and AMG-7, full modulation between high and low fire is available.

Electronic controls used in the burning of oil are also used to guarantee that the main gas valve cannot be opened unless a pilot flame is established.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 874.

Liquid Snowplow Wax

A liquid wax for spray-gun application on snowplow wings and moldboards is announced by Speco, Inc., 7308 Associate Ave., Cleveland, Ohio. It is a companion product to standard Snow-Rem which is applied with a paint brush.

The new spray possesses a high Carnauba wax content. It contains silicone resins which are said to produce a smooth long-lasting water-resistant surface, and it covers approximately 300 square feet per gallon, Speco says. Snow-Rem spray is available in 1-gallon open-top cans, 5-gallon pails, and 55-gallon drums.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 952.

Rope Slings and Fittings

A booklet on Purple Strand wire-rope slings and fittings is available from Bethlehem Steel Co., Bethlehem, Pa. Purple Strand is the Bethlehem trade name for improved plow steel, a tough steel said to combine great strength with high resistance to wear and fatigue.

The booklet tells how to order wire-rope slings. It illustrates and describes all standard slings in the Bethlehem line—single-part, grommet, braided single-leg, choker, braided-choker, 2 and 4-leg bridle slings, etc.—and fittings such as sockets, eye hoist hooks, pear-shaped links, and rings.

This literature may be obtained from the company by requesting Booklet 281, or by using the Request Card at page 16. Circle No. 857.

A. O. Smith Appoints Madden

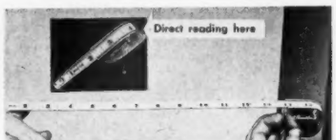
John B. Madden is Hydraulic Sales Manager for the North Central District of A. O. Smith Corp., Milwaukee, Wis. His office is at 310 S. Michigan Ave., Chicago, Ill.

Mr. Madden was formerly Product Supervisor at Houston, Texas, where the firm makes its vertical turbine pumps. He succeeds Hal Kern, who will now be able to concentrate on distributor accounts in the field.

Steel Measuring Tape

A new steel measuring tape for use in hard-to-reach or poorly lighted places has been designed by Master Rule Mfg. Co., Inc., 40 Mulberry St., Middletown, N. Y.

To use the Streamline tape you butt the right-angle tip against one wall of the space to be measured, then extend the tape until the straight-sided case is flush against the opposite wall. A flick of the locking lever retains the measurement, and you can move the Streamline into the light and read the measurement directly at the top of the case.



The Streamline tape measures hard-to-reach or poorly lighted places.

The Streamline comes in 6, 8, and 10-foot lengths, with etched blue steel or black-on-white tapes. It has a 4-way tape (graduations on both edges of both sides), a slip-proof lock, a pistol-butt case, and a decimal-equivalent chart. It can be used for inside or outside measure, as a height or depth gage, and for outside caliper measure or layout work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 865.

Here's what WE mean by

The Newest, Finest

DESIGNED FOR YOUR JOB

These Allis-Chalmers tractors are new models, not merely refinements of existing ideas . . . they are new from the ground up . . . without compromise anywhere in design or material.

They are the answer to your demands for tractors that will give you outstanding performance with any equipment — mounted or drawn. New POWER, WEIGHT and BALANCE put each model in a class by itself! And there's a complete new line of Allied equipment to match these tractors for your job.

BUILT TO "TAKE . .

These are the finest tractors e . . . wi ample capacity and strength i part! A that's no accident! To bring ctors li these . . . with the qualities y . . . All Chalmers built them complete

You can depend on them the loa and jolts of today's jobs . . . be are mo ern tractors built for the most operati conditions. They will more th ure up your expectations!

HD-5
40.26 drawbar hp., 11,250 lb.

HD-9
72 drawbar hp., 18,800 lb.

YEARS AHEAD

Each of these new Allis-Chalmers crawlers gives you a new yardstick for rating tractors. Each sets new standards in its class for performance, strength, servicing, operation. Get the full story from your Allis-Chalmers dealer NOW on this — The Newest, Finest Tractor Line on Earth.

ALL

T C

New Soil-Mechanics And Foundations Text

Rapid developments in soil engineering have resulted in many new textbooks on the subject. One of the latest of these is "Introductory Soil Mechanics and Foundations", a basic text for civil and architectural engineers who need to apply the principles of soil mechanics to their routine problems and to make intelligent appraisals of specialists' recommendations. The new book is authored by Consulting Engineer, George B. Sowers, Lt. Colonel, Corps of Engineers, AUS (Res), and George F. Sowers, Associate Professor of Civil Engineering, Georgia Institute of Technology, and Consulting Engineer at Law-Barrow-Agee Laboratories, Inc.

The book stresses the rational, scientific approach to soil and foundation problems, and explains how the theories are applicable in situations that engineers are likely to encounter in practice. It is well illustrated and contains many references for the reader who wishes to follow up specific points in greater detail.

"Introductory Soil Mechanics and Foundations" is available from the Macmillan Co., 60 Fifth Ave., New York 11, N. Y. Its price is $4.75.

Concrete-Vibrator Sets

A bulletin describing high-cycle electric concrete-vibrator sets has been prepared by Homelite Corp., 71 Riverdale Ave., Port Chester, N.Y. It gives complete specifications for the Chicago Pneumatic high-cycle vibrator, the cable, and the Homelite dual-purpose generator.

Use of the sets, according to Homelite, results in high-quality concrete, fast placement, and reduced hand labor and maintenance. No engine scaffold is required, since the generator can stay on the ground.

The folder also illustrates other applications for the generator: powering universal electric tools, high-cycle tools, floodlights, etc.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 940.

Two V. P.'s for Aeroquip

Benjamin A. Main, Jr., and H. L. Schrock, Jr., have been elected vice presidents of Aeroquip Corp., Jackson, Mich. Mr. Main, Vice President in Charge of Engineering, has been with Aeroquip since 1942; while Mr. Schrock, Vice President and Treasurer, joined the company in 1947.

Tractor Line on Earth!

EASY TO OPERATE . . .

Operators have long awaited the greater handling ease and comfort now brought to them by this new line of Allis-Chalmers tractors.

Conveniently located controls respond to the slightest effort . . . and are operated in the same familiar way—nothing tricky to "catch on to." There is new shifting ease, new seat and platform comfort, full visibility.

Because the operator's job is easier — takes less effort—he can maintain a steady pace, do a better job throughout his shift . . . day after day.

EASY TO SERVICE . . .

Adjustments are easier . . . lubrication simplified and lube periods greatly extended. Mechanics say these tractors are the easiest to service and repair.

This all adds up to less down time, more producing time . . . longer tractor life at less upkeep cost.

HD-15
109 drawbar hp., 27,850 lb.

HD-20
Hydraulic Torque Converter Drive, 175 net engine hp., 41,000 lb.

ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

New Truck-Care Plan

Truck users may add to the productive life of their equipment as result of a nation-wide truck-conservation program initiated by the Motor Truck Division of International Harvester Co., 180 N. Michigan Ave., Chicago 1, Ill. Directed at cost-conscious owners, the Truck Saver Plan provides savings in equipment investment through longer service life and reduced down-time.

The plan consists of an agreement entered into by International and truck owners, setting forth a schedule of inspections and costs. Truck-saving operations in three stages are adapted to the need of each individual truck, whose maintenance is to be placed on a uniform schedule. International has also designed a special truck-saving diagnosis to handle the needs of vehicles which cannot be brought in regularly.

The company points out that the average age of trucks today is about 1½ years higher than in 1941, and that careful regular maintenance is not only good business, but essential to staying in business. International hopes to anticipate future new-parts requirements on the basis of information provided by regular truck inspections. It lists the following direct benefits of its plan to truck operators: better truck performance over longer truck life, reduced maintenance and down-time costs, protection of truck value, and minimized delays in obtaining new parts.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 853.

Defense Transport Administrator Knudsen, right, and DTA's Street and Highway Division Director H. E. English, left, approve of the International Truck Saver Plan as W. K. Perkins, center, Sales Manager of the Motor Truck Division of International Harvester Co., explains it to them.

New Weld-On Plates For Worn Track Links

A weld-on plate for resurfacing track links worn too deep for the successful use of weld overlays has been introduced by Caterpillar Tractor Co., Peoria 8, Ill. The company is concentrating on new techniques to keep machines in operation while there is a scarcity of steel and other metals. The new method makes it possible to resurface track links worn in excess of ⅜ inch and can be applied to D7 and D8 tractors.

Track-type tractors roll on the steel rails formed by the track links. Induction hardening is applied to the rail surfaces, so that wear normally appears only after long use, Caterpillar says. The weld overlay is a method developed earlier to restore the surface of worn parts, and Caterpillar recommends its use as soon as track links are worn through the original surface hardness of about ⅛ inch. Successful overlays are possible up to three thicknesses, or about ⅜ inch, but beyond this point, track-link plates are more economical for the D7 and D8, according to Caterpillar. Made of hardened and tempered steel, these plates resist abrasion and shock.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 933.

Self-Lubricating Wood

Complete technical information on lignum vitae, a natural self-lubricating antifriction material which resists water and many acids and chemicals, is available from Lignum-Vitae Products Corp., 101 Boyd Ave., Jersey City, N. J. Suitable for many mechanical applications, lignum vitae is the hardest and heaviest wood that grows and has its origin in the tropics. One-third of its volume is made up of a natural resin, which gives it a self-lubricating quality. It can economically supplant metals, plastics, fiber, and other materials in various phases of industry. It has been used for bearings, bushings, pulleys, and rollers.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 893.

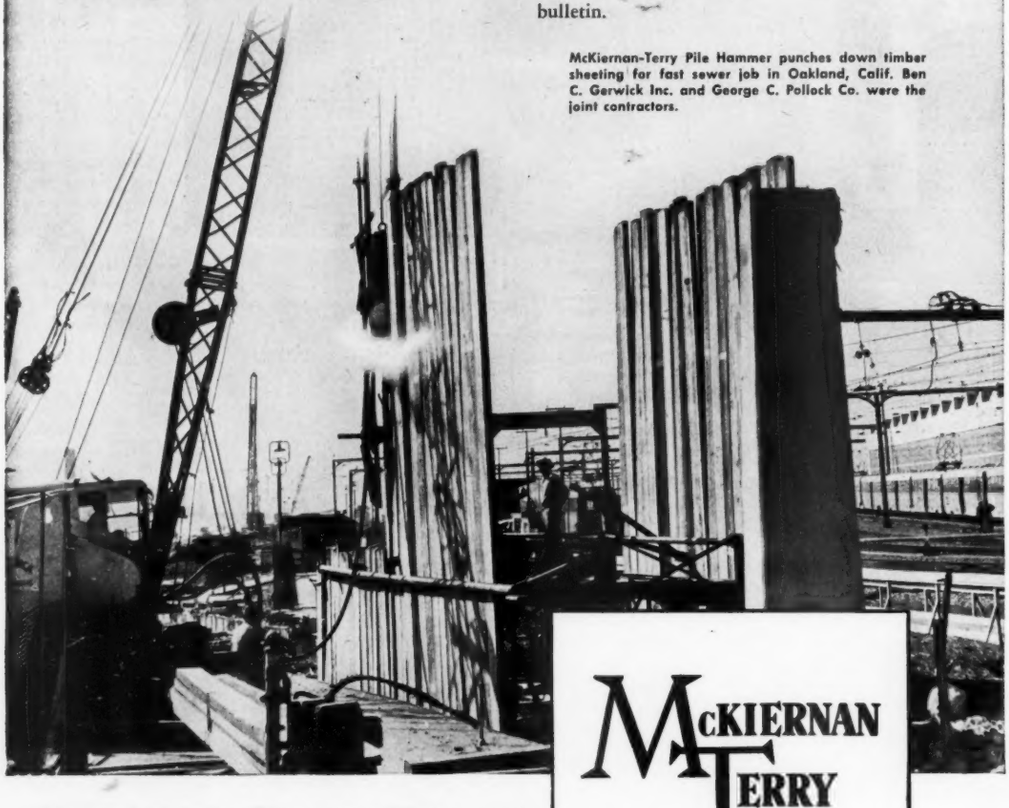
McKIERNAN-TERRY
PILE HAMMERS
Help Beat Schedule
on sewer project

Eight months ahead of schedule! That was the record chalked up on this Oakland outfall sewer line, despite wet heaving ground that required sheeting of trench every inch of the way. An ingenious mobile sheeting jig and fast-driving McKiernan-Terry Pile Hammers solved the problem.

Here's how. The jig held lagging for 20 lin ft of timber sheeting on both sides of the trench at the same time. Sheeting was driven quickly by McKiernan-Terry No. 6.5 Double-Acting Hammers . . . as much as 245 pieces of sheeting daily.

Wherever you need speed and pile-driving power, it will pay you to use dependable McKiernan-Terry equipment. Wide-range line includes 16 sizes of single-acting and double-acting hammers and 2 sizes of double-acting extractors. Write for bulletin.

McKiernan-Terry Pile Hammer punches down timber sheeting for fast sewer job in Oakland, Calif. Ben C. Gerwick Inc. and George C. Pollock Co. were the joint contractors.



McKIERNAN TERRY

McKIERNAN-TERRY CORPORATION • MANUFACTURING ENGINEERS
19 PARK ROW, NEW YORK 38, N. Y.
Plants: Harrison, N. J., and Dover, N. J.

MK-306

STEEL SHEET PILING

Upkeep of Roadsides Is Nation-Wide Task

State Highway Departments Mow Grass, Spray and Trim Trees; Varied Equipment Maintains Neatness and Helps Safety

• KEEPING the nation's roadsides trim, safe, and attractive is an operation of major scope in virtually every section of the country. During the spring and summer months, the rhythmical buzz of the power mowing machine can be heard along the highways of almost every state as maintenance crews wage their annual battles with fast-growing grass and weeds. Many highway departments have expanded their roadside maintenance programs to include several methods of weed control; some give special care and attention to the trees that line their highways.

To determine the over-all scope of roadside maintenance in the nation, CONTRACTORS AND ENGINEERS MONTHLY recently surveyed the various state highway departments. The survey discloses a wide variance in methods, means, and equipment—but if the scope of operations is any criterion, there is widespread agreement on the importance of lending "eye appeal" to America's highways.

Many traffic safety engineers today agree that, for psychological reasons, a neat roadside supports the cause of highway safety. From an entirely practical standpoint, unsightly weeds and tall grasses detract from (and often obscure) traffic signs, guardrails, etc. Certainly the trim roadside helps attract and hold the tourist trade. Further, no one wants a scraggly eyesore for his front lawn. These are some of the reasons for the growing emphasis on roadside maintenance.

Roadside Mowing

Roadside mowing appears to be a universal operation. The length of the mowing season varies with climate, but mowing machines are active along the highways of every state in the nation during the months between May and September.

Five states — Alabama, Florida, Georgia, Missouri, and Virginia—report that their mowing seasons extend through December. The New England states have the shortest seasons. Connecticut mows only from May through August. Aside from Florida—which mows the year round in its southernmost areas—no state commences mowing before April.

Most of the states mow shoulders, slopes, and ditches about three times each year. Parkways, medians, and intersections are sometimes mowed as frequently as every two to three weeks. California mows its entire right-of-way three to seven times each year, indicating that mowing machines are more active in that west-coast state than anywhere else in the country. Louisiana mows its right-of-way six times each year. Most of the states mow the entire right-of-way at least once each year. Typical is Illinois, which mows twice from fence to fence, once over shoulders and ditches. Many states have different mowing schedules for their primary and secondary roads. Kentucky, for example, mows four times each year on the main routes, twice on roads of less importance.

Types of Mowing Machines

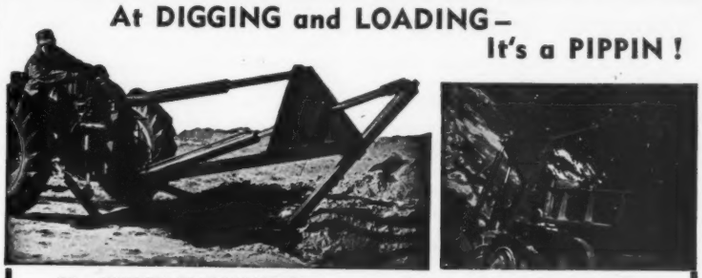
The survey reveals no definite pattern as to the number and type of mowing machines owned by the various states. Such variable factors as each state's highway mileage, climate, and mowing habits make a comparison of equipment difficult. New Hampshire, with 3,728 miles of state highway (according to the latest available Bureau of Public Roads figures) finds need for only seven mowing machines. Missouri —with 17,993 highway miles—has 281 power mowers, 433 pull mowers, and the intention of purchasing more.

Following is a list of representative states with a breakdown of each state's highway mileage and its mowing equipment:

Alabama (with 7,688 miles of high-

(Continued on next page)

At DIGGING and LOADING— It's a PIPPIN!



The PIPPIN EXCAVATOR — a combination digger and loader attachment for Ford and Ferguson tractors —

- Back hoes, front hoes, shovels and loads
- Converts from back to front hoe in five minutes
- Digs 7′ deep. Back hoe buckets available from 15″ wide to 37″ wide.
- Bucket capacity 1/5-yd.
- Bucket elevates to 14′ above grade
- Load swings laterally to 110 degrees

For greater work capacity and lower costs, get a PIPPIN!

WRITE FOR CIRCULAR

PIPPIN CONSTRUCTION EQUIPMENT CO., Inc., White River Junction, Vt.

B.F.Goodrich

These tires carry 95 tons over crushed limestone—with ease!

HAULING heavy loads over jagged rock in all kinds of weather calls for tires that can really "take it." Yet this is an everyday occurrence for these B. F. Goodrich Rock tires. The BFG's shown here are used on vehicles that haul limestone and shale from quarry to plant. The total load is 190,000 lbs., of which 88,000 lbs. is pay load.

B. F. Goodrich tires can give this kind of service because they are built to stand up under the most hazardous quarry and construction hauling conditions. For added protection, the patented *nylon shock shield* is built into all B. F. Goodrich tires of 8 or more plies. Extra strong, elastic nylon cords are placed between the tread rubber and the cord body. Under impact, these cords work together, absorbing and distributing the shock evenly. The shock shield protects against bruises and means more recappable tires as well as longer service. Here is a construction advantage which is found only in BFG tires — and at *no additional cost.*

B. F. Goodrich tires are also available in all-nylon construction. For these or any off-the-road tires see your BFG dealer. Or write for additional information on these tires that do a better job at lower cost. *The B. F. Goodrich Company, Akron, Ohio.*

RESEARCH KEEPS B.F.Goodrich FIRST IN RUBBER

Upkeep of Roadsides Is Nation-Wide Task

(*Continued from preceding page*)

way) owns 124 tractor-type mowers; Arkansas (9,720 miles) has 50 power mowers; California (13,797 miles) uses about 70 mowers; Connecticut (with 2,948 miles) has 34 tractor mowers, 138 sickle-bar mowers of various makes, and 6 Worthington Blitz mowers; Georgia (14,728 miles) uses about 100; Idaho (5,033 miles) has 4 Case, one Toro, 15 Centaur, and 10 Topeka mowers; Indiana (10,487 miles) has 180 tractor mowers; Iowa (9,752 miles) uses 385 sickle-bar units; Kansas (9,914 miles) has 167 power tractor mowers, 181 pull-type sickle bars, and 7 power lawn mowers; while Kentucky (11,524 miles) uses 238 self-propelled power mowers.

Louisiana (14,764 miles) has a wide assortment among its 276 units, including 28 Detroit mowers on Case tractors, 60 Internationals, 28 Toros, 19 Worthington gang-reel units, and 22 Whirlwinds. Maryland (with 4,606 miles) owns about 40 mowers; Nebraska (9,470 miles), 180 tractor mowers; New Jersey (1,722 miles), 70 rotary power mowers, 2 cutter-bar power mowers, and 60 of the sickle-bar tractor-mounted type. In North Carolina (64,421 miles) there are 175 tractor mowers, along with some pull-type farm mowing machines; of Ohio's 512 units (18,412 miles), 475 are the tractor type and the others the pulled type; Oklahoma (10,143 miles) has 225 mowers; and Oregon (with 7,238 miles) uses 27 pulled and 84 power mowers.

Pennsylvania (40,972 miles) has 190 tractor mowers and 113 power-driven hand-controlled machines; Rhode Island (842 miles) has 25 mowers, mostly the sickle-bar type. In South Dakota (6,224 miles) there are 178 power mowers; in Tennessee (7,811 miles), 400 tractor-type; in Texas (33,358 miles), 325 tractor-type. Vermont (1,821 miles) has 12 International mowers; Virginia (with 47,929 miles) uses 200 tractor mowers, 50 power hand mowers, and 4 tractor-drawn gang mowers; Washington (6,276 miles) has 12 sickle-type mowers; West Virginia (32,605 miles), 130 power mowers; and Wyoming (with 4,563 miles), 24 Toros, 8 Topeka, and 6 Case units.

Even the casual reader of this sampling will observe the lack of any definite relationship between a state's climate and mileage on the one hand and the amount and type of its mowing machinery on the other.

Special Care for Trees

About half the states give special care and attention to the trees that line their highways. Generally the scope of this work is limited because of the high cost of spraying, trimming, cutting, and pruning, and the scarcity of trained tree men.

At least 21 states chemically spray their trees, on occasion at least. Most of the 21 report that spraying is done "when needed" or under "emergency" conditions when trees are threatened by disease or insects. Spraying is a regular once-a-year operation in five states —Indiana, Maryland, Massachusetts, Rhode Island, and Tennessee.

Various insecticides and fungicides are applied in differing strengths depending on local conditions. Arsenate of lead is the most commonly used chemical. Other popular spray ingredients include DDT, nicotine, and sulfate. Kansas makes wide use of "stomach poison".

Spraying Equipment

Highway departments in general own little special equipment for tree spraying. On the basis of the survey, only 12 have such equipment. Weed-spraying equipment is often pressed into emergency service when insects or disease pose a threat to the trees. California owns twelve 500-gallon tree-sprayers. Connecticut has 3 Bean Rotomists and 5 high-pressure hydraulic sprayers. Illinois has 20 power pressure sprayers. Kansas uses hand and portable pump sprayers. Maryland has about 10 units, 50-gallon and smaller. Michigan has four 500-gallon hydraulic power sprayers and six 200-gallon units. Missouri has one power sprayer and a number of hand sprayers; it rents others as needed. Nebraska relies on hand sprayers. New Jersey owns one power mist blower, 2 truck-mounted power sprayers, and 12 knapsack sprayers. Pennsylvania uses 5 Friend power sprayers; while Virginia has 3 Kramer 250-gallon power sprayers and 8 knapsack units. In Massachusetts, Indiana, and Rhode Isand, trees are sprayed by contract.

Tree Trimming

Approximately half the states make a definite point of trimming their roadside trees and removing the dead ones. In only about a dozen states, however, are there special crews for this work. Other states have no special crews, but use regular maintenance crews when there is need for tree trimming or removal.

As might be expected, the power chain saw is the most commonly used item of equipment for trimming and removing trees. Following is a cross-section summary from representative states, showing the number and type of tree-trimming crews and the type of equipment used (the states' highway mileages as based on BPR figures are indicated in parentheses):

California (13,797)—11 tree crews, totaling approximately 50 men, using 12 Homelite chain saws and such miscellaneous gear as old drag saws and motor-truck equipment. Connecticut (2,948)—20 tree crews employing 20 chain saws. Illinois (12,112)—tree crews organized as needed, with 20 power chain saws available for the work. Massachusetts (1,970)—7 crews, with equipment including cranes, saws, and a truck assigned to each crew. Michigan (9,329)—6 crews, each with a power saw and specially equipped tree-trimming trucks. New Jersey (1,722)—one state-wide crew on part time, 8 other crews, under landscape foremen, on small-scale operations. New York (14,268)—16 tree crews and 20 special trucks equipped with winches and power saws. Ohio (18,412)—7 of

(*Concluded on next page*)

Scottie "Globe Trotter" McBlock says, "Harums May Scare 'em" but I'm a smooth operator anywhere.
Construction men the world over depend upon
McKissick
CONSTRUCTION BLOCKS
★ For Top Grade Efficiency
★ For Low Cost
THEY'RE GUARANTEED TO CARRY RATED LOADS FOR THE LIFE OF THE BLOCK.
Large center pins and bearing diameters.
Available in all sheave sizes from 6" to 36". Any capacity from 1 to 300 tons. All steel construction. Bronze bushings or hi-load roller bearings.
Write for catalog and information on this and other McKissick Products.
McKissick Builds A Better Block for Every Purpose.
McKISSICK
McKISSICK PRODUCTS CORPORATION
Box 2496 Tulsa, Oklahoma

HEAVY-DUTY TRENCHER

WITH NEW IMPROVED SELF CLEANING BUCKET — Capacity ½ yd.

A heavy-duty trench digger, which is designed for a wide variety of trenching for any highlift tractor with hydraulic bucket control.

It will increase the tractor's production from 30 to 50 per cent. and is easily attached by one man in 15 minutes.

The Whitestown trencher is equipped with a ½-yard standard bucket. Special buckets, made to individual specifications, may be obtained. It will dig to a depth of 8 feet and dump at a height of 12 feet. This trencher has been in constant use for four years, and has proved to be rugged and satisfactory in every way.

The Whitestown Trencher is now available for use on the following hydraulic controlled tractors:

Allis-Chalmers HD-5G equipped with TS-5 Tractor-Shovel
Caterpillar D-4 and Trackson HT-4
International TD-6 & TD-9 equipped with new Bucyrus-Erie dozer-shovel
International TD-6, TD-9 & TD-14-A with Hough Bulldozer-shovel
Hough Model HM-Payloader
Oliver with 4-A Lull Loader

● *Immediate delivery can be made.* ● *Please specify make of tractor.*

WHITESTOWN TRENCHER CO., INC.

Wood Road, Whitesboro, New York — Phone: Utica 6-1117

NAMEPLATE and IDENTIFY Your EQUIPMENT WITH CHICAGO DECALS

Durable—Quickly Applied
Most Economical
Minimum quantity, 50 Decals
For Information and Samples Write:

CHICAGO DECALCOMANIA CO.
3310 N. Elston Ave., Chicago 18, Ill.

the 12 divisions have tree crews; Mall, Disston, and Homelite chain saws are included in the equipment. Pennsylvania (40,972)—no special crews, but 20 power saws available for use when needed. Rhode Island (842)—one tree-trimming crew, but no power equipment, since large trees are topped by contract. Texas (33,358)—men specially trained for tree work in each of the 198 maintenance sections; each section is equipped with conventional tree surgeon's hand tools and with power saws. Virginia (47,929)—25 skeleton crews organized among regular maintenance personnel, but no special equipment. Washington (6,276)—work handled by regular maintenance crews equipped with large power brush cutters, hand pruners, and saws.

With few exceptions, there are state laws which protect roadside trees from interference by either private individuals or public utilities. In most states, special permits are required before the trees can be touched by either utilities or individuals. In Washington, private individuals under no conditions are permitted to molest roadside trees.

Weed Control

While many states are not yet overly active in the tree-care phase of roadside maintenance, every state appears to be an active participant in weed-control operations. Methods and theories vary widely, but everybody gets in the act. There is a particularly wide area of disagreement where the use of chemical sprays is concerned. More than half the states employ chemicals in their weed-control operations, but many tend to regard spraying as an experimental operation.

Iowa considers seeding as its major weed-control measure. This is on the theory that "a good smother crop of grasses and legumes makes the best method of controlling weeds." The State holds mowing next in importance and regards spraying as a last resort—reserved for weed patches and bad bushy areas. D. B. Chittenden, landscape engineer for the Iowa State Highway Commission, explains:

"I cannot wholeheartedly agree with those who advocate continued spraying of the entire right-of-way. Some indiscriminate spraying has brought out a good deal of opposition here in Iowa, and I believe much of it is justified. In fact, two or three of our counties started out on their secondary roads spraying everything from fence to fence. In three years' time, they dropped back from complete spraying to spot spraying in areas still infested with weed or brush." Mr. Chittenden adds that "mowing instills a certain degree of vigor into grass plants", a factor which he thinks should not be overlooked in a roadside maintenance program.

South Carolina, too, takes a dubious attitude toward chemical sprays. That state has experimented with various chemicals as weed killers, but reports that growth from May to October is so rapid that chemicals have not proved economical because "it is necessary to cut the roadside anyway". In Wyoming, the use of chemical sprays is confined mostly to sterilization of the ground around and under timber bridges and guardrails. There is some spraying in irrigated sections.

Other states apparently have found the chemical spray to their liking as a weed-control agent. New York has sprayed "several thousand miles" in the past two years. Arizona averages 1,000 miles annually. Connecticut during the past two years has sprayed 1,000 miles each year for control of poison ivy alone.

By far the most popular chemical is 2,4-D. The majority of the states also use 2,4,5-T. Other popular chemicals include sodium chlorate, Borascu, and various oils. A typical spray would contain 2,4-D, water, and 2,4,5-T. Most of the states agree that no one chemical serves all purposes.

A wide variety of equipment is in use for weed control. Arizona employs a shop-built power tank for spraying. California uses "sprayers, mowers, disks, tractors, etc." in a program which costs $60,000 annually for the control of noxious weeds and $150,000 for the elimination of weeds which are considered fire hazards. Connecticut uses small gear-pump assemblies; Illinois, low-pressure power sprayers. Kansas—which sprays around 475 acres each year to control bindweed—has found it impractical even to try to spray the entire right-of-way; Borascu is applied to local areas by hand and by small distributors. Michigan makes use of 200-gallon spray rigs.

In line with Nebraska's policy of employing regular maintenance equipment to the fullest extent possible, that state mounts a 2 to 5-hp engine on a common base together with a 500-gallon tank, hand sprayers, and a side boom. This rig is mounted in the box of a dump truck and used for weed spraying. New Jersey permits flowering weeds to stand unmolested, but uses hand sprinkle cans in an attack on other weeds which grow between island curbs and between the pavements on dual highways. In general, weed control is still considered to be in an experimental stage in New Jersey.

Ohio, which sprays an average of around 1,500 acres annually, equips its mowing crews with knapsack sprays for spot use on poison ivy, thistle, and similar weeds. Special spraying crews are equipped with large power sprayers. Vermont employs 5-gallon knapsack sprayers, CO_2-operated.

The growing emphasis on roadside maintenance is reflected in Virginia's

(Concluded on next page)

Do your sealcoating and ice control jobs the fast easy Swenson way. Spreads salt, chloride, sand or cinders any width or amount desired.

Free Information

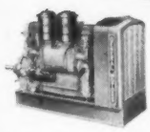
Swenson Spreader & Mfg. Co.
Lindenwood, Illinois

GM Diesel-powered crushing plant

GM Diesel powers air compressor for drilling

GM Diesel-powered Koehring shovel

Only Two Hours' Down Time in Two Years



CRUSHING 50,000 tons of limestone a year, Casey Stone Co., of Liberty, Kentucky, depends on GM Diesels *exclusively* to power its plant.

Jaw crusher, roll crusher and hammermill are each driven by a GM 6-71 engine. Another 6-71 drives the compressor and a 3-71 powers the shovel.

"GM's are entirely satisfactory . . . give us all the power we need," says L. C. Brock, manager. He reports they haven't had more than two hours' down time in two years and total repair costs for all five engines in three years' operation amounts to less than $250.

Why Is It? The answer is General Motors Diesels are built to do *more work at lower cost.* Their sturdy two-cycle operation delivers power at every piston downstroke—smooth, steady power that's quick to respond to varying load demands. Fuel consumption is low, and simplified design with readily accessible interchangeable parts makes maintenance easier and much more economical.

All these features add up to dependable, profit-making operation. It explains why GM Diesel engines are offered as standard or optional equipment in over 500 kinds of power machinery by 120 different manufacturers. Write for full details.

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SINGLE ENGINES ... Up to 275 H.P. **DETROIT 28, MICHIGAN** MULTIPLE UNITS ... Up to 800 H.P.

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

Upkeep of Roadsides Is Nation-Wide Task

(*Continued from preceding page*)

attempt to speed the decay of roadside stumps through application of 2,4-D and 2,4,5-T. In each of the state's eighty highway districts, experimental roadside sections have ben selected for application of the mixture. During the interval between one brush-cutting season and another, Old Dominion engineers are hopeful that the stumps will decay and disappear—thereby effecting a sizable saving in maintenance costs.

Roadside maintenance in nine states today is handled by special landscape units within the highway organizations. In other states, the work is handled by any of several departments —including design, location, construction, maintenance, signs or highway markings.

Regardless of who handles the program, there is every indication that it is a growing one—a conclusion which should come as welcome news to state chambers of commerce, garden clubs, and the motoring public in general.

A Smooth-Ceiling System For Flat-Slab Construction

Design features, merits, test data, and applications of flat-slab construction are covered in a brochure prepared by Smooth Ceilings System, 802 Metropolitan Life Bldg., Minneapolis 1, Minn. The Smooth Ceilings System may be used for flat-slab construction with concrete, steel, or cast-iron columns; steel column heads or grillages are embedded in the slabs, and no concrete caps are required on the columns. The folder outlines the basis of design, presents design data, and drawings of typical details, and tabulates the comparative strength and stiffness of SCS floors.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 935.

A workman adds a decorative cap to the mile-long serpentine brick wall Ford built to hide its test track at Dearborn, Mich. The design blends into the scenic road near Greenfield Village.

Undulant Brick Wall Is Over a Mile Long

Possibly the longest serpentine brick wall in the world has been built for over a mile to conceal the test track of the Ford Motor Co. in Dearborn, Mich. Engineers chose the design for its beauty, patterning it after a wall built by Thomas Jefferson at the University of Virginia in the early 19th century. They also chose it for its economy.

One brick thick and 8 feet high, the 7,100-foot-long wall required no bracing or other strengthening devices. A concrete footer 2 feet wide and 3½ feet deep shaped the wall's series of symmetrical reverse curves of 6-foot radius. The completed wall contains more than 400,000 yellowstone red bricks. Twenty-foot cyprus, plywood, and wrought-iron gates give access to the test track and body-engineering building.

Ryerson Appoints to Buffalo

A new sales manager for its Buffalo, N. Y., plant is announced by Joseph T. Ryerson & Son, Inc., Chicago, Ill., steel distributor. He is Paul L. Wright, formerly Office Manager and Supervisor of the company's Inside Sales Department. Mr. Wright has been with Ryerson since 1939.

Oxyacetylene Flame Cleaning speeds bridge repainting —without traffic interruption

McCANN STEEL COMPANY, Nashville, Tennessee, was asked to bid on a bridge conditioning and repainting job. It was essential that the work be done quickly and, most important, with minimum traffic interruption, since the bridge was located on a highly-travelled roadway. The most difficult part of the job was the removal of old paint and rust.

F. T. Wilson, Airco technical sales service representative, recommended oxyacetylene flame cleaning to remove scale and old paint prior to repainting. This process, requiring minimum equipment, leaves a warm, clean surface, which is conducive to a long-lasting paint job. Notice in the photograph how the rivet heads are being cleaned with a round tip and the flat surface is being conditioned with a wide flat tip.

The entire bridge was cleaned most satisfactorily, without disrupting traffic too greatly. City officials were very pleased. Bids for reconditioning a second bridge across the Cumberland River will specify the use of flame cleaning.

If you have steel structures exposed to the elements, requiring long-time paint protection, investigate the advantages of Airco oxyacetylene flame cleaning. For technical service or copies of bulletins ADG-1066A, ADG-1067 and ADR-57, describing this process, please write your nearest Airco Office.

AIRCO

AIR REDUCTION

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READY-MIX CONCRETE PLANTS

WITH A LITTLEFORD "Kwik-Steam" VAPOR GENERATOR

Here's the fastest most modern steam producing unit ever designed. You get steam in 2 minutes time from a cold start and save as much as 50% in fuel and labor. No experienced operator is needed, no hard fuels, no starting hours ahead to get steam. Just start the "Kwik-Steam" Generator and the automatic controls take over. This amazing unit cycles off and on to produce steam only when needed. Burns low cost fuel oil. It's small, compact and made in sizes from 20 to 165 B.H.P. Can be used also for cleaning equipment, steaming aggregate cars, heating water. For Fast, Safe, Economical service, all Ready-Mix Concrete Plants should have a "Kwik-Steam" Generator. Write for Bulletin 22 for further details.

LB LITTLEFORD

LITTLEFORD BROS., INC., 485 E. PEARL ST., CINCINNATI 2, OHIO

Jackson's improved vibratory compactor propels itself at 25 fpm and delivers up to 4,500 1¾-ton blows a minute. The auto trailer that mounts it also carries a Jackson power plant and a hydraulic jack for picking up and lowering the compactor.

Vibratory Compactor

An improved vibratory compactor is made by Jackson Vibrators Inc., Ludington, Mich. It propels itself at approximately 25 fpm, delivers up to 4,500 1¾-ton blows per minute, and compacts 900 to 1,200 square feet per hour. Its smooth base makes it suitable for asphalt pavement patching (either hot or cold mixes), the manufacturer says, and for subbases and base courses of crushed materials. It is said to compact waterbound macadam to maximum density in two passes.

The compactor can also be used on granular soils in floor subbases, in trenches, at bridge approaches, or wherever it is necessary to secure maximum density of granular materials quickly. It handles most granular materials in 12-inch lifts and is designed to attain maximum density usually in two passes. A corrugated base is substituted for the smooth base for best results.

The compactor has one moving part: the shaft of the heavy-duty vibratory motor. For quick maneuverability it mounts on an auto trailer unit which also carries a 2.5-kva Jackson power plant and a hydraulic jack for picking up and lowering the compactor. The power plant generates both single-phase and 3-phase 110-volt 60-cycle ac and may be used to operate other power tools and lights as well as the compactor. It is equipped with a permanent-magnet generator which is said to require no adjustment or maintenance other than lubrication.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 864.

Night Dew Affects Signs

Research to discover how dew dims traffic signs at night is described in a 4-page report available from Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn. The report, "What Dew Does", includes graphs which show the effect of dew on the nighttime readability of six different types of standard traffic signs: glass reflector buttons, plastic unit-type reflectors, and four types of Scotchlite reflective sheeting. Also shown in the graphs is the effect of short and long periods of dew on the different signs.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 991.

White Sales Managers

In order to develop new markets for components of White trucks and busses, The White Motor Co. has formed an industrial sales division with headquarters at the company's main offices, 842 E. 79th St., Cleveland, Ohio. Milton W. Brooks, formerly a regional sales manager for Cummins Engine Co., Inc., is Sales Manager of the new division.

White also announces the appointment of Roderick H. Clarke as Sales Manager of its Sterling Division. Mr. Clarke, who will make his headquarters at the division's plant in Milwaukee, Wis., was formerly assistant to the president of the Autocar Co. and has had wide experience in truck transportation.

Prestressed-Concrete Strands and Fittings

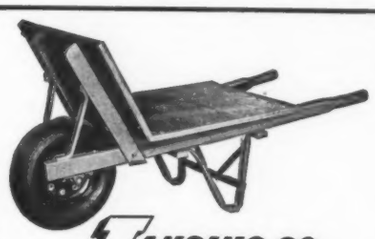
Probably the first catalog on materials or products for prestressed concrete has been prepared by John A. Roebling's Sons Co., 640 S. Broad St., Trenton 2, N. J. The 12-page booklet describes factory-made prestressed cable assemblies for use in the Roebling Americanized prestressed - concrete system. They are stranded of cold-drawn hot-galvanized acid-steel prestressed-concrete wire. Attached to the cables are specially designed terminals ready for the tensioning job which can be done with an inexpensive jacking unit in a matter of minutes.

The catalog covers beam design, wire, strand, fittings, and jacking equipment, and tells how to order. Its style is simple and the subject matter can be understood by anyone interested in prestressed concrete.

This literature may be obtained from the company by requesting Catalog T-916, or by using the Request Card at page 16. Circle No. 912.

LANSING BRICK & TILE WHEELBARROW

The Lansing J15-A, an improved model of a wheelbarrow that has been a favorite for years, is rugged and dependable. Designed balance places most of the load on wheel. Ask your dealer, or write factory or one of our warehouses for details.



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Blending with every landscape and free from glare, roads built with Tarvia* road tar take the strain out of driving. They are self-healing under impacting traffic.

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because

1 Roads built with Tarvia* road tar improve with age. Occasional applications will renew the life of the surface, and replace worn-away material.

2 TARVIA road tar penetrates surfaces and binds together the underlying material. It thus makes possible the inexpensive use of local aggregates.

3 Less TARVIA road tar is required because there are less solvents to be evaporated before the binder becomes effective.

4 TARVIA road tar is unaffected by gasoline, kerosene, or moisture. It retains its original properties.

5 TARVIA road tar holds the aggregate tightly in the surface, and produces a gritty surface which is lastingly skid-resistant.

6 TARVIA road tar may be applied at moderate temperatures, and with ordinary equipment.

The Barrett field man is always at your call for expert practical advice.

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The OTC Power-Twin hydraulic sleeve puller is a versatile unit. It will pull and install cylinder liners on more than 200 models of trucks, tractors, and power units.

A Hydraulic Puller For Cylinder Liners

A special sleeve-pulling and installing set has been announced by Owatonna Tool Co., 381 Cedar St., Owatonna, Minn., as part of its Power-Twin hydraulic pulling system. Claimed to be one of the most versatile systems yet devised by the company, the set will pull and install cylinder liners on more than 200 different makes and models of trucks, tractors, and power units.

The OTC Power-Twin sleeve puller is adjustable to center over the bore and to provide clearance over cylinder-head studs. It removes and installs sleeves from 3 to 6 inches without damage or distortion. Present OTC sleeve pullers may be adapted to the Power-Twin hydraulic unit by adding only a few parts.

Further information may be secured from the company, or by using the Request Card at page 16. Circle No. 996.

New Signal Flasher

A lightweight portable electronic signal flasher, without moving parts or filaments to burn out, has been announced by Haledy Electronics Co., 57 William St., New York 5, N. Y. It is of cold-cathode tube design and is said to emit a sharp brilliant flash of light clearly visible for approximately a mile. In its compact rainproof aluminum case measuring 6 x 6½ x 10 inches, it is unaffected by vibration, humidity, or temperature, the company points out. It weighs 8½ pounds and can be carried by a handle.

The flasher utilizes a set of three standard 90-volt batteries in series. The life of these batteries is lengthened since all battery energy is used only to generate the bright flashing signal. An off-on switch as well as an outside knob to control the number of flashes per minute is provided. A clear or colored precision Fresnel lens protects the cold-cathode tube.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 880.

The new Haledy Electronic Co. signal flasher emits a flash of light visible about a mile away.

Surveying Instruments

A 5 x 7-inch folder containing technical data and illustrations of a complete line of geodetic and topographic instruments is available from Henry Wild Surveying Instruments Supply Co. of America, Inc., 26 Court St., Brooklyn 2, N. Y. The line includes small levels, high-precision levels, universal and precision theodolites, plane table outfits, and pentagonal prisms. Price lists are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 907.

New Plant for Galion Iron

Increasing demand for motor graders and rollers has led to an expansion program by Galion Iron Works & Mfg. Co. Earlier this year the firm announced the building of a new plant in Wakefield, Yorks., England. Now it has purchased a large modern factory in Bucyrus, Ohio, 12 miles west of the company's main offices and factory in Galion.

The Galion Iron Works & Mfg. Co. was founded in 1907 for the manufacture of sectional cast-iron pipe. From these beginnings, Galion products have advanced through successive stages of horse-drawn graders, gasoline-powered 3-wheel road rollers, early motor graders and pull-type tractor-graders, to the present line of equipment.

N. Y. Good Roads Director

L. Judson Morhouse, of Ticonderoga, N. Y., has succeeded Charles H. Sells, who resigned as Executive Director of The New York Good Roads Association. Mr. Morhouse, an attorney, was a member of the State Assembly until he resigned from that body in September. He has been on the Association's Board of Governors for some months.

Surfa-slick Patent Applied For

SELF-HEATING ASPHALT SMOOTHING IRON

HOT IN TEN MINUTES
HOT ALL DAY LONG

Contractors! This lightweight, rugged, simple, time and money saving smoothing iron will pay for itself in a few days use.

No more building and tending fires on your asphalt jobs!

- RUGGED
- SIMPLE
- SAFE
- ECONOMICAL
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- COMPACT

Dealer inquiries requested.

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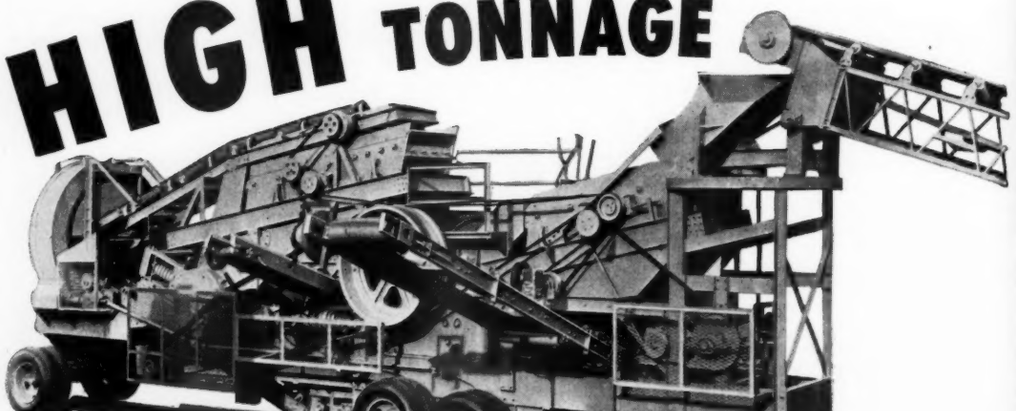
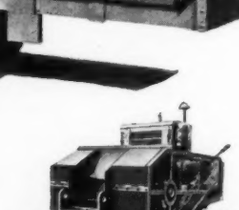
HIGH TONNAGE



UNIVERSAL 293QS TwinDual Gravel King for big jobs requiring volume production. Three stages of crushing, two screens.

LOW TONNAGE



UNIVERSAL Model GA Portable Jaw Crushing Unit. A complete self-contained plant for many small crushing jobs.

MEET ANY TONNAGE REQUIREMENT WITH UNIVERSAL STANDARD PLANTS

High tonnage, low tonnage—for any type of aggregate from riprap to aglime, or road ballast to washed sand—you can depend on Universal to meet your production requirements.

The wide range of cost-cutting, field-proved Universal standard plants permits selection of the right equipment without special built-to-order expense. Whether your jobs are big, medium, or small, Universal builds the plant you want for low cost production. Ask your Universal distributor or write for illustrated literature.

The most complete line of Portable, Semi-Portable, and Stationary Crushing, Screening, Loading and Washing Equipment.

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Sewage Plant Poses Dewatering Problem

High Ground-Water Table Is Lowered by Wellpoints to Build Sewage Plant for City of Olympia, Wash.

• "WHEN we finished the concrete work in the pumphouse floor, I figured the job was done".

So said Matthew McCarthy, contractor on the new $250,000 sewage-treatment plant built by the City of Olympia, Wash. The new installation is on the shores of Boston Harbor in Puget Sound, only 10 blocks from the city center. McCarthy was referring to what he believes was the worst problem of the contract: the successful dewatering of the sewage-plant area so some of the deep buildings could be constructed.

On New Fill

The treatment plant, which will correct Olympia's present pollution problem caused by dumping raw sewage into the bay, rests on a relatively new fill of tight silt, dredged in three years ago.

Designed by the consulting-engineer firm of John W. Cunningham & Associates, the treatment plant will handle a maximum of 10 mgd of combination sewage and storm-drain water. There is also provision for rapid pumping of storm water up to 50 mgd during heavy rains, and for incineration of screenings.

A 60-inch influent line leads into the plant, and there is a 42-inch storm outfall. Sewage passes first through a pumphouse, where grit removers and automatic bar screens are located. The bar-screen mechanism was made by Chain Belt Co., and the grit collectors and elevator were made by Jeffrey Mfg. Co. One 6-inch and three 8-inch sanitary pumps are Fairbanks-Morse. Two big 24-inch Worthington pumps handle storm water.

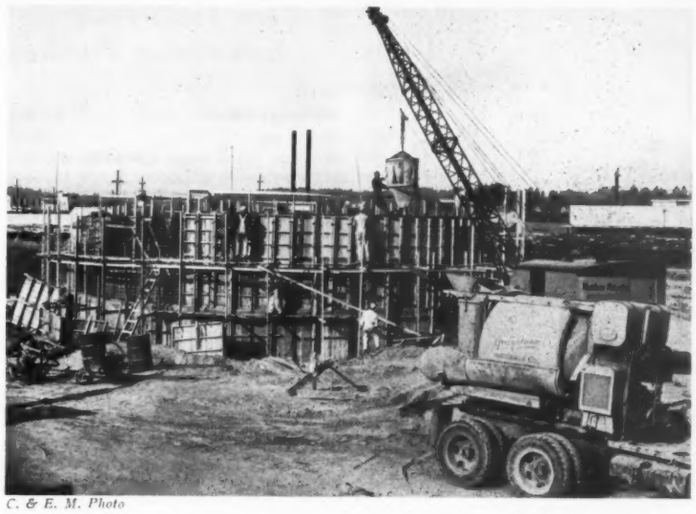
Solids settle out in three tanks, each 14 x 129 feet. Effluent liquid then passes through a 30-inch line out to the deep-water channel in the harbor. Solids go to two 2-stage sludge digesters 50 feet in diameter and 20 feet high, with spherical concrete domes. After digestion is complete, the sludge flows by gravity to 6 drying beds. Three of these beds measure 45 x 75.75 feet; three are 45 x 69.75 feet; glass covers are to be added to them. It is expected that the dried sludge will be hauled away gratis by users of the product.

Pumphouse Dewatering

McCarthy was concerned over what might be a bad dewatering problem, because the pumphouse foundation was only 300 feet from the bay, and it went down 25 feet below normal water level. His concern was realized when, after uncovering the top 3 feet of ground, the water table was visible.

A 3-bent pile trestle was then driven near one corner of the pumphouse. It

(Continued on next page)



C. & E. M. Photo

A digester pour on the Olympia, Wash., sewage-plant project. The piece of equipment in the foreground is a Rex Moto-Mixer, while the crane is a Northwest 25.

The Quinn Standard is known as the best the world over, wherever concrete pipe is produced and used. Backed by over 35 years' service in the hands of hundreds of Quinn-educated contractors, municipal departments and pipe manufacturers who know from experience that Quinn pipe forms and Quinn mixing formulas combine to produce the finest concrete pipe at lowest cost.

Quinn Heavy Duty Pipe Forms

For making pipe by hand methods by either the wet or semi-dry processes. Built to give more years of service—sizes for pipe from 10" up to 120" and larger—tongue and groove or bell end pipe at lowest cost.

WRITE TODAY. Complete information, prices, and estimates sent on request. Also manufacturers

QUINN CONCRETE PIPE MACHINES

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COST ACCOUNTING FIGURES SAY

Buy a "QUICK-WAY" for your business!

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MORE WORK PER DAY

LESS COST BETWEEN JOBS

BUILT TO LAST LONGER

8 DIFFERENT MONEY-MAKING ATTACHMENTS

STANDARD PARTS INTERCHANGEABLE

When there's a *QUICK-WAY* on the job, construction work tickets and cost accounting figures point to BIG PROFITS on every hour of operation.

The reasons . . . *QUICK-WAY* is simply built and precision engineered. It's many machines in one — with 8 money-making attachments.

All parts are simple and easy to get at . . . this holds servicing time and expense at the minimum. More working parts are interchangeable for easier, cheaper maintenance.

A *QUICK-WAY* mounts on any standard truck of proper size to go anywhere a truck can go at truck speed. *QUICK-WAYS* are built low for stability on the job and on the road — clear low underpasses — can be shipped airborne.

Day-in, day-out performance of over 7,000 *QUICK-WAYS*, in all parts of the world, suggests it will pay you to use *QUICK-WAYS* in *your* business.

There are 4 QUICK-WAY MODELS to meet the needs of any operation, large or small.

Mail Coupon Today!

"QUICK-WAY" TRUCK SHOVEL CO.

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"QUICK-WAY" TRUCK SHOVEL CO.

Dept. 25 — 2400 East 40th Ave.,

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Please send me complete details on "QUICK-WAY" Truck Shovels—four different models from 3 to 10 ton crane capacity.

NAME_____

ADDRESS_____

CITY_____ STATE_____

Dewatering was a big problem, as can be seen from the ground-water level. Wellpoints are being set.

Sewage Plant Poses Dewatering Problem

(Continued from preceding page)

was capped and covered with fir planks strong enough to carry a Northwest 25 dragline. The entire pumphouse was encircled with a line of Stang 30-foot wellpoints, placed 30 feet out from the building. The tip of each point was jetted in to a position 5 feet below the foundation. The 84 wellpoints went in on 4-foot centers, and were connected to a main header. Two Gorman-Rupp 8-inch pumps were used to maintain a vacuum, and the water discharged through a line to the bay. Andrews Machinery Co. of Seattle furnished the wellpoint equipment.

After a week of pumping, a satisfactory job had been done. The tight silt formation greatly retarded water infiltration and the dewatering curve was steep. Tide variations up to 15 feet from low to high did not greatly affect the pumpage, which remained about 50 gpm during the course of the dewatering operation. However, at high tides some trouble was experienced due to water coming in through the base fill near ground level. This water was collected in sumps and removed with small portable pumps.

After a week of pumping, the Northwest dragline gets on with the excavation. It works on a trestle, loading to dump trucks which haul the material off to one side.

The Northwest dragline then finished the excavation, working on the trestle and loading to dump trucks which hauled the material off to one side of the site. Much of this material was stockpiled and used later on for backfill. Incidentally, the wellpoint vacuum had to be maintained until after the buildings were completed and filled above natural ground line, since building design was predicated upon weight of backfill to help counteract the flotation effect of the high ground-water table.

When the pumphouse excavation and construction were out of the way, the wellpoints were removed and reset to encircle the two digesters. The scheme worked as well as it had on the pumphouse. Nevertheless, according to McCarthy, it was a distinct relief when the substructures were finished and everything was above ground-water level.

Forming With Green Lumber

It may sound as if lumber was in plentiful supply to say that forming was done with Douglas fir. Yet that was the case, and even so it was no easy job. Most of the lumber was green and wet from the mills on the bay. As it dried in the sun, it shrank rapidly. It presented a constant problem.

Where the concrete surfaces were not exposed or too important, ordinary shiplap facing was used, and the fins from form shrinkage cracks were dressed down after the concrete was placed. Exposed concrete work was formed with plywood facing. All forms were prefabricated in a carpenter yard, where a DeWalt power ripsaw and other small carpenter's tools were located. Ordinary doubled 2 x 4 studs and wales held the facing, and Burke form clamps held the panels together.

An unusually efficient scheme to plumb the walls of the digesters was used. Burke form clamps were bolted to the digester floors about 12 feet from the walls. The wall forms were then joined to these floor anchors by 2 x 4 ties. Threaded bolts with nuts above

(Concluded on next page)

Now, greater protection for harder working heavy-duty fleet engines

New and better...

STANOLUBE HD-M
REG. U. S. PAT. OFF.
Motor Oil

For nine years, STANOLUBE HD Motor Oil has demonstrated its ability to cope successfully with the most difficult problems of lubrication in automotive diesel and heavy-duty gasoline engines. Now, all of the outstanding qualities of this product have been incorporated in a new and better heavy-duty lubricant: STANOLUBE HD-M Motor Oil.

In extensive field tests, new STANOLUBE HD-M has proved its ability to benefit harder working heavy-duty fleet engines these two ways:

1. Extends engine life. Because of improved detergent-dispersant action, new STANOLUBE HD-M keeps engines clean under severe conditions imposed by adverse fuel quality, higher operating temperatures, and prolonged periods of hard operation. Freedom from harmful deposits means less wear, longer life for fleet engines.

2. Reduces maintenance. Because it has greater oxidation stability, new STANOLUBE HD-M helps keep pistons, rings and valve stems free from varnish-like deposits caused by oil oxidation and provides protective films of oil in the face of high operating temperatures. Less wear of engine parts, longer periods between overhauls mean less overall maintenance.

A Standard Oil lubrication specialist can help you obtain maximum lubrication benefits from STANOLUBE HD-M. To reach him, just phone your local Standard Oil Company (Indiana) office.

Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.

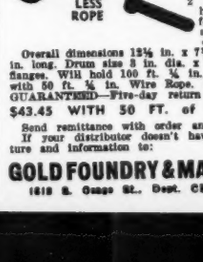
A Complete Line of Motor Oils for Every Heavy-Duty Service Need

STANOLUBE HD-M is recommended for all internal combustion engines. It meets U. S. Army specification MIL-0-2104. This lubricant provides excellent cleanliness, low wear rate, and low oil consumption under severe operating conditions. Available in all SAE grades.

STANOLUBE S-1 is recommended for use in automotive, diesel, or gasoline engines where other heavy-duty oils cannot control deposits caused by operational severity or adverse fuel quality. It meets requirements of MIL-0-2104 and the requirements for "series 1" type oils as well. Available in all SAE grades.

STANOLUBE HLA is recommended for use in supercharged diesel engines and in other engines that operate under the most adverse conditions. It meets the requirements of MIL-0-2104 and the requirements of "series 2" type oils. Available in SAE 10 and SAE 30 grades.

STANDARD OIL COMPANY (INDIANA) STANDARD



¾ TON WINCH

$33.00 LESS ROPE

This Hand Winch is ideal for moving and installing heavy machinery, loading trucks, hand cranes, gin poles, loading logs, sawed lumber, loading implements on trailers, hoisting silage, pulling wells, etc. Can be bolted anywhere and operated in any position. Made of electric steel; bronze bushed; 2 speeds, 8.16 to 1 for heavy loads . . . 3 to 1 for fast operation . . . self locking to hold loads at any position.

Overall dimensions 12¼ in. x 7⅛ in. x 7 in. Handle 18 in. long. Drum size 3 in. dia. x 6 in. long x 6 in. dia. flanges. Will hold 100 ft. ¼ in. Wire Rope. Illustrated with 50 ft. ¼ in. Wire Rope. Shipping Wt. 37½ lbs. GUARANTEED—Five-day return privilege.

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1818 S. Osage St., Dept. CE, Independence, Mo.

and below the bottom connection of the 2 x 4 permitted the tops of the forms to be moved in or out. When the wall forms were perfectly plumb, the nuts above and below were snugged up to hold the plumb position during the pour.

Concrete Placing

A materials-supply agreement with Graystone Materials Co. of Olympia insured a supply of fresh concrete whenever it was needed. Concrete consisted of a 6-sack mix, with 1¼-inch maximum-size aggregate. Air was entrained in the digester concrete, but not in the concrete for other structures.

As the Rex Moto-Mixers from Graystone Materials Co. came in to the site, the concrete was dumped either direct to forms, or, in the case of higher pours, to a 1-yard Gar-Bro transfer bucket. The Northwest 25, doubling as a crane for concrete work, then hoisted the concrete to its point of placement. Two Mall gasoline-powered vibrators were on hand to consolidate the mix and work it around the reinforcing steel.

The forms were allowed to remain in place for at least four days. They were then stripped, and the green concrete received a water cure for 7 days.

Work began January 1, 1951, and McCarthy expected to have the project finished and ready to deliver to the City by October 15, 1951. The intercepting sewers and 30-inch outfall were placed by Werner & Riddle of Eugene, Oreg. The 620 feet of 42-inch overflow line leading out into the deep-water channel from the plant was done by Harold E. Olds of Tacoma.

McCarthy subbed certain specialty portions of the new plant to several firms. The 25-foot untreated fir piles under the digesters were driven by Roy Kimball of Shelton, using a light skid rig and a steam hammer. Capitol Plumbing & Heating Co. did the pipe and plumbing work. Olympia Electric Co. did the electrical work in the pumphouse substructure, and Lassen Electric Co. had the remaining electrical work.

Personnel

Field operations under Matthew McCarthy were directed by L. L. Sphar, with Frank Taylor as Engineer and Stanley Hill as Carpenter Superintendent. E. G. Rice was Resident Engineer and Wilfred Jupenlaz was Project Engineer for the consulting engineers. Charles Williams of Olympia is City Engineer, and W. S. Ransome was Acting Resident Engineer on this job.

Completion of the new plant is expected to help eliminate a source of raw-sewage pollution of Puget Sound, and to give Olympia better disposal control of its sewage and storm water.

Bulletin on Driveshafts

A bulletin on Morse Morflex radial and universal driveshafts is available from Morse Chain Co., 7601 Central Ave., Detroit 10, Mich. It gives complete data and specifications on radial driveshafts with spline-jointed tubular shafts; universal driveshafts with one-piece tubular shafts; and universal driveshafts with spline-jointed tubular shafts. It also provides a working table of maximum recommended lengths and speeds.

This literature may be obtained from the company by requesting Bulletin F 41-51, or by using the Request Card at page 16. Circle No. 894.

A. V. Cook Chief Architect

Arnold Voorhees Cook, A. I. A., has joined the firm of Kelly & Gruzen, Architects-Engineers, New York, N. Y., as Chief Supervising Architect in charge of all field operations.

Mr. Cook, formerly associated with Wigton-Abbott Corp. and Merritt-Chapman & Scott Corp., has been architect and project engineer on a number of hospitals, chemical laboratories, and industrial installations. During a period of private practice in Morristown, N. J., he designed and supervised the construction of various public and industrial buildings.

Footpath to Highway

If your sons—or daughters—want to build roads too, and you're tired of telling them just how it's done, there's a book you might turn them loose in. It's called "Construction Ahead" and it's written and illustrated by Henry Billings.

On the theory that the change from footpath to modern highway during the last hundred years has been pretty much the same story in Massachusetts or Florida, Iowa or California, the author concentrates on New York Route 199. In the first part of the book he follows the history of 199 from deer and Indian and pack trail, through mud road and corduroy, to macadam. In the second part, he describes its transformation, in 1948, to an asphaltic-concrete highway that can handle the 8,000 cars a day coming off the Taconic Parkway.

Vivid pictures and detailed descriptions in story form show how men and machines remade the road, from the first scale drawings to the final laying of the hot-mix and the landscaping of shoulders and embankments. Johnny and Susie will have a pretty fair notion of what does what and how when they close the book. They may even be able to talk shop with you at the dinner table.

The Viking Press publishes "Construction Ahead"; its address is 18 E. 48th St., New York 17, N. Y. The book costs $3.00.

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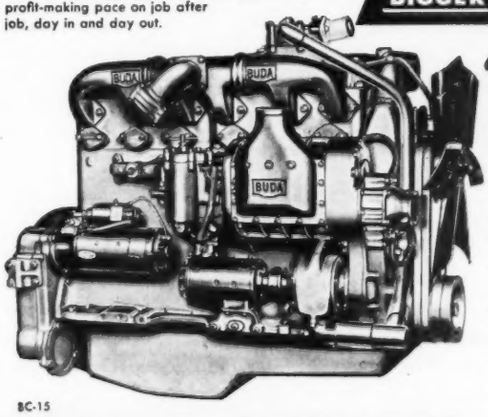

BC-15

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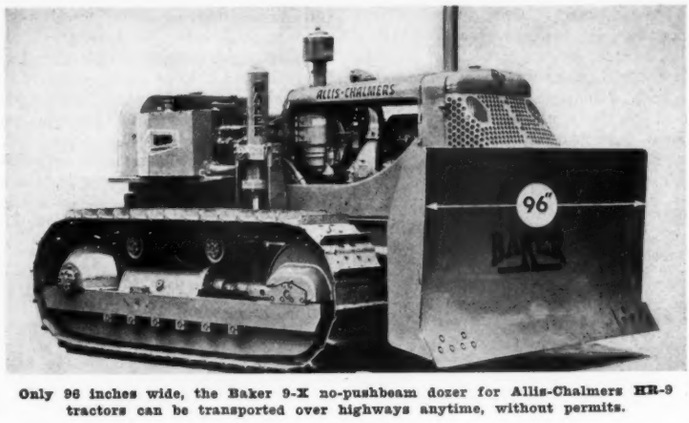
Narrow Dozer Blade For Quick Job Moves

A large no-pushbeam bulldozer that can be hauled freely on the highways without special permits is announced by The Baker Mfg. Co., 2573 S. 10th St. at Stanford, Springfield, Ill. The 9-X mounts an 8-foot-wide blade on the 70-drawbar-hp Allis-Chalmers HD-9 tractor. It has nearly the same total blade area and capacity as the conventional 9-foot 6-inch model for the HD-9 tractor. It is of special interest to contractors making many moves from job to job, particularly when over-night special-width permits are not available, Baker says.

Dozer frame and tractor frame on the new unit are bolted together as an integral unit; thus the tractor frame itself becomes the pushbeam. The tractor-dozer is raised and lowered as an integral unit by double-acting hydraulic cylinders connecting to the truck frame through a completely new lifting mechanism. In mounting the 9-X, the front spring and saddle are removed and the spring pads are replaced by special brackets for the lifting mechanism. This mechanism is so designed that the principal forces enter the truck frame vertically as in the standard dozer mounting. This new type of mounting and suspension is said to increase clearance. Track alignment is maintained by the standard HD-9 A-frame, and independent track action is permitted through compensation in the hydraulic cylinders for unequal track elevation.



Only 96 inches wide, the Baker 9-X no-pushbeam dozer for Allis-Chalmers HR-9 tractors can be transported over highways anytime, without permits.

The blade will go 37 inches above and 13 inches below ground. The angle of approach when digging in, however, is steeper than might be expected. This is due to the closer mounting of the blade to the tractor frame which permits it to swing on a short radius. This quicker in-and-out characteristic saves time and reduces excess dirt removal on some types of jobs, Baker says.

The center of gravity of the 9-X-mounted tractor remains well back of the second roller regardless of blade position, to provide good traction. It also permits use of the tractor for drawbar work with the blade mounted, without undue wear on front-end truck bearings. The new unit weighs 3,400 pounds. It can be used for the same applications as the standard heavy-duty blades, and for jobs where narrower clearances occur, or where "job jumping" makes its use practical and economical.

Complete details on specifications and performance characteristics are provided in Engineering Bulletin No. 896-A available from the company. Or use the Request Card at page 16. Circle No. 895.

Road-Surface Skid Resistance

The roughness of a road surface and its relation to skid resistance is the subject of Highway Research Board Bulletin No. 37. The bulletin includes a report by Ralph A. Moyer and John W. Shupe, of the University of California, on recent measurements taken on certain pavement surfaces in California; and a paper by A. Duke Morgan, of the North Carolina Highway Department, on the correlation of the roughometer and skid tests with the design and mix of pavement types.

The two papers give an exhaustive account of the tests in California and North Carolina, complete with diagrams and photographs. Conclusions are that the roughness trailer designed by the Bureau of Public Roads provides an accurate measure of road roughness; and that sand-asphalt roads in general give a better skid-resistant riding surface than bituminous concrete.

"Roughness and Skid Resistance" (Bulletin No. 37) may be obtained from the Highway Research Board, National Research Council, 2101 Constitution Ave., Washington 25, D. C. The price is 90 cents.

Gayle Is Ingalls President

Kenneth H. Gayle, Jr., has been elected President of The Ingalls Iron Works Co., Birmingham, Ala. He succeeds the late R. I. Ingalls, Sr.

Mr. Gayle has been with the company since 1923 and has served in its New Orleans, Pittsburgh, and New York offices. At the time of his election he was Vice-President in Charge of Sales in the area served by the New York office. In his new capacity as President, Mr. Gayle will make his headquarters at Ingalls' executive offices in Birmingham.

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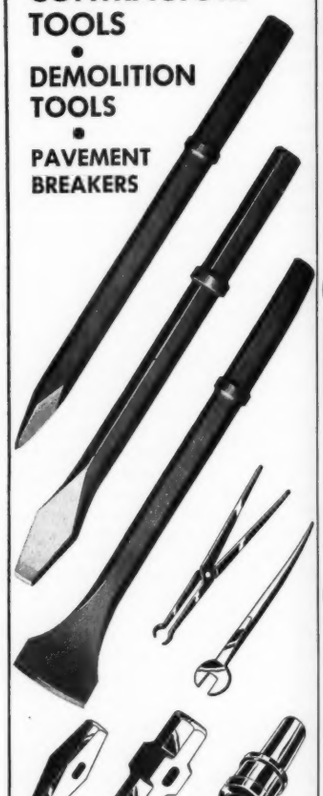

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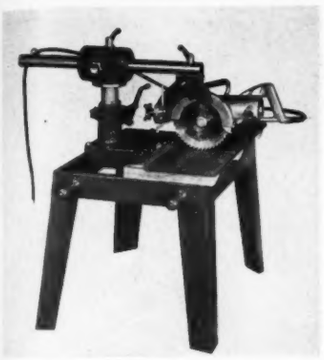

The Comet retractable radial arm for hand saws comes complete with column, base, and worktable.

Hand Saw Is Mounted On New Radial Arm

A fully retractable radial arm on which electric hand saws can be mounted is a new development by Consolidated Machinery & Supply Co., 2031 Santa Fe Ave., Los Angeles, Calif. The Comet radial arm comes complete with column, portable steel base, and hardwood worktable. It increases the use of electric hand saws by making them as suitable as radial saws for trimming studs, cutting rafters, and other mass-production sawing, the company says.

The Comet has a cutoff movement of 24 inches, which is ample for all ordinary lumber sizes. Bevel range is 0 to 45 degrees; miter range is 45 degrees right or left. The column on which the arm is mounted adjusts 9¾ inches vertically. The radial arm rides on 8 fully enclosed, permanently lubricated, ball-bearing rollers. The manufacturer reports that all controls are large, grouped for easy operation, and have calibrated settings for all cuts. There are also positive locks to prevent creeping or variation from cut to cut.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 883.

New Spur-Gear Hoist

A spur-gear hoist in ½ and 1-ton capacities is available from Coffing Hoist Co., 800 Walter St., Danville, Ill. The Challenger weighs 39½ pounds including a standard length of coil chain for an 8-foot lift. It can be easily moved from one place to another.

Formed steel plate in the housing is said to give the hoist strength and resistance to shock-load breakage. Its back plate is laminated to give rigidity for supporting the hoist mechanism. It may be disassembled for servicing in a matter of minutes with simple tools. And it is said to hang true whether or not it is supporting a load. To give it long life and high efficiency, the unit is sealed and running in lubricant.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 888.

C. L. Best, of Caterpillar

The American construction industry lost a pioneer inventor and tractor builder when C. L. Best died in San Francisco on September 22, 1951, at the age of 73. The "father" of crawler tractors, Mr. Best was one of the founders of Caterpillar Tractor Co., Peoria, Ill., and at the time of his death he was Chairman of the Board and a member of the Executive Committee of that company.

"Leo", as he was known to his friends, had a colorful background in the true pioneer tradition, for he was the son of Daniel Best, a west-coast manufacturer who left Keokuk, Iowa, in the 1850's at the age of 23 to join a wagon train bound for Oregon. There he worked as a hunter, gold miner, and sawmill operator, finally turning to the manufacture of grain cleaners. The Best Mfg. Co., founded by Daniel Best, was of considerable interest to the young Leo, and by the time he was 18 he was appointed buyer; at 20, he was superintendent. In 1910, when his father disposed of his business, Leo opened his own farm-machine factory, known as the C. L. Best Tractor Co., at Elmhurst, Calif., and began the manufacture of gasoline wheel tractors.

During the next 15 years the C. L. Best Tractor Co. embarked on the manufacture of gasoline - powered track-type tractors, introducing a number of improvements such as the removal of the tiller wheel for compactness and flexibility; while the Thirty and the Sixty tractors designed by C. L. himself in 1919 and 1920 were of such an advanced type and so well built that some are in operation today. At that time he strongly advocated the adoption of the diesel engine as the power source for track-type tractors, and Caterpillar still uses this prime mover exclusively to power its machines. In 1925 the C. L. Best Tractor Co. and the Holt Mfg. Co., were merged to form Caterpillar Tractor Co., and Mr. Best became Chairman of the new organization.

C. L. never gave up contributing engineering ideas, and he would spend hours drawing designs in his "engineering department"—a room set apart for this purpose in the home he built last year at Walnut Creek, Calif. But his interests were wide, and embraced a perpetual concern for the human element in the manufacturing world.

Carroll for Taylor Forge

Gale Carroll has joined the Houston District Sales Office of Taylor Forge & Pipe Works, Chicago, Ill. He was formerly Sales and Advertising Manager for Tube-Kote, Inc.

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Owners of Joy K-type Paving Breakers like the interchangeability of many parts which keeps parts stocks at a minimum . . . and like all "Silver Streak" breakers the Super Heavyweight K-89 is CADMIUM PLATED inside and out with that silver-like covering which prevents rusting, eliminates scoring of piston and cylinder, and aids lubrication. ● Write today or contact your nearest Joy office or distributor for complete details about this NEW heavy-duty breaker.

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High Bridge Is Built Across Little River

Rising Water in the Clark Hill Reservoir Calls for Tall Piers; Earth-Moving Equipment Constructs Long Approach Fills

(*Photo on page 1*)

• CLARK Hill Dam near Augusta, Ga., is backing up not only the Savannah but also Little River to form a reservoir of 78,000 acres with a pool level at 335 elevation; top of dam is at 351. This new, deep lake has necessitated the replacement of several bridges which in time would be flooded by the rising waters. One of the more important bridges being replaced is the old Storey Mill Bridge carrying Georgia State Route 47 over Little River at a point 9 miles west of the new dam.

A contract for a new bridge and approaches, downstream from the old span, was awarded by the State Highway Department of Georgia to the joint-venture contractor team of E. H. Hines Construction Co., Inc., of Greenwood, S. C., and Robert E. Lee, Inc., of Manning, S. C., on their low bid of $1,411,340.60. Work got under way on August 29, 1950, and is scheduled for completion this fall. The cost is expected to overrun slightly since the foundation for the center pier was taken to an elevation lower than was originally estimated.

The bridge connects Columbia County on the south with Lincoln County on the north, and lies 26 miles north of Augusta. On the south side the approach is 2.2 miles long, and 1.2 miles on the north side. The structure has a total length of 720 feet made up of four truss spans—160, 200, 200, and 160 feet long—supported on a reinforced-concrete substructure of three piers and two floating-type abutments built on the high approach fills.

Tall Piers

Construction of the piers, numbered 1, 2, and 3 from north to south, was subbed to the A. P. Tuck Construction Co. of Greenwood, S. C. The first concrete was poured on September 14, 1950, and continued through the winter until the piers were completed on March 15 of this year. The winter was mild and the river remained at a low stage within the bounds of its channel between piers 2 and 3. This good behavior permitted the building of the substructure without resorting to cofferdams. Pumps kept the excavation holes dry for the footing pours. Less than a week after the pier contractor had completed his work, the river rose until it extended from pier 1 to pier 3 covering all footings and part of the stems with water.

Footing for pier 1 is 32½ x 20 x 4 feet deep, supporting two stems that measure 7 feet 8 inches x 9 feet 4 inches at the base, battering in to 4 x 5 feet at the top. For pier 2 the footing is 33 x 18 x 7 feet deep from which rise stems that are 8 x 10 feet 9 inches at the base, and 4 feet 6 inches x 5 feet 6 inches at the top. The south or No. 3 pier has a

(*Continued on next page*)

Georgia State Highway Department Photo

A Wooldridge Terra Cobra, a LaPlant-Choate motor scraper, and a LeTournapull are push-loaded in a borrow pit on the north side of the Georgia bridge.

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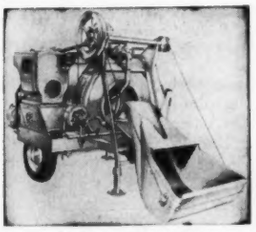

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CONSTRUCTION MACHINERY COMPANIES WATERLOO, IOWA

32 x 17½ x 7-foot-deep footing, with the stems measuring 7 feet 4½ inches at the base and 4 x 5 feet at the top.

At the top the pier stems are connected by a cap. They are also joined by a 1-foot 3-inch web wall that extends downward 65 feet from the cap. Below the web wall are two cross beams, one above and the other below the ground line, also to stiffen the stems. No. 2, the center pier, is the tallest, measuring 134 feet from the bottom of footing to top of cap. The other two piers are founded on somewhat higher ground and are about 8 feet shorter. The reservoir will have a depth of 124 feet at the center of the bridge.

Wood forms were used in the pier work, and the concrete was placed in lifts averaging 28 feet. In addition to the conventional ties and bracing, the high forms were secured with 14 cables anchored in the ground—5 wires on each side of the pier and 2 at each end. A portable AggreMeter was set up at the structure being built, and concrete was mixed in a Rex 3-bag mixer with another in reserve as a standby.

Penn-Dixie bag cement from Clinchfield, Ga., was mixed with sand and stone furnished by Weston-Brooker Co. of Camak, Ga. Water both for the mix and curing was pumped from Little River. The Hall Steel Co. of Atlanta, Ga., supplied the reinforcing material. Three Northwest crawler rigs were on the job—two with 60-foot booms and a third with 112 feet of stick for lifting the concrete bucket for the high pours, working along the sidehill river bank to take advantage of the more elevated ground. The smaller ¾-yard machines excavated for the footings with drag buckets, and also placed concrete for the lower lifts. At pier 2 a dirt ramp was built up to the pier for the cranes to work from.

Heavy Grading

Grading for the approach abutments also continued throughout the winter, and was completed by the middle of March. The 2.2-mile approach on the south end was subbed to the Fred Ross Construction Co. of Smyrna, Ga., while the prime contractors graded the 1.2-mile northern approach. Over 2,000,000 cubic yards of material was required to build up the embankment fills which have a maximum height of 111 feet at the bridge abutments. Since the Federal government had already acquired the surrounding land for the reservoir, there was no problem of acquiring pits for the necessary borrow.

Material for the fills was taken from approximately 250 acres of pits located both up and downstream at both ends of the bridge. The depth of cut was limited only by the rock stratum that lies beneath the overburden. In places the material was excavated to a depth of 18 feet, but the average cut was 5 feet. About 80 per cent of the borrow was clay, with shale making up the remaining 20 per cent. Wherever possible the shale was put into the upper lifts of the fill, with the clay going on the bottom. The maximum haul from borrow pit to approach embankment was only ½ mile.

Rubber-tired equipment for the longer dirt-moving hauls included 5 Tournapulls, 4 LaPlant-Choate motor scrapers, and 2 Wooldridge Terra Cobras. For the shorter hauls there were 6 Caterpillar D8 tractors teamed with LeTourneau 10 to 15-yard Carryalls. Push loading was done with 5 Allis-Chalmers HD-19 tractors, 2 HD-17's, and 3 D8 tractors. Dozing the fill lifts was handled by 3 D8's and an HD-19. Embankments were compacted to 95 per cent Proctor density, with the areas under the abutments increased to 100 per cent density. The compaction was achieved with 6 tamping rollers pulled by rubber-tired tractors. Final shaping of the fills was done with 4 motor graders—one Allis-Chalmers and 3 Caterpillar No. 12's.

Riprap on Slopes

Hauling equipment entered the narrow road embankment at the lower end adjoining the borrow pits, discharged their loads, and returned to the pits via downhill ramps. The ramps were filled in as one of the final steps in the grading. A typical embankment section has a 40-foot roadway including a 20-foot pavement flanked by 10-foot shoulders. As the bridge is reached the shoulder width is reduced to 6 feet. Crowned at the center, the pavement pitches 2 inches in 10 feet, while the shoulders slope 8¾ inches in 10 feet.

Sideslopes are 2:1 from the crown down to the 300 elevation level where there is a 5-foot berm; from that point to the toe the slopes are 2½:1. The slopes are covered with riprap up to the 335 mark, the future water line of the reservoir. Above that the slopes and also the shoulders will be sprigged with Bermuda grass.

Riprap was obtained from a 20-acre rock quarry on the north side of the bridge, involving a 6,000-foot haul to the north approach and a 7-mile haul to the south side via the old bridge. After blasting, the rock was dug out by a Northwest 1½-yard shovel and hauled in 4 Euclids, 10 Macks, and 6 Ford trucks. The blanket of stone is 3 feet thick along the slopes. Except at end rolls where the earth fill was placed on a 1½:1 slope and stone, riprap was placed on a 2:1 slope with a minimum thickness of 2 feet at elevation 335.

Steel-Truss Superstructure

After the embankments were completed, work was started on the two floating abutments under a subcontract to the Hannah Construction Co. of Greenwood, S. C. They were completed in June, permitting the erection of the structural-steel superstructure designed for H15-44 loading. Riveted through trusses were assembled at the Birmingham, Ala., plant of the Virginia Bridge Co. which will also do the erecting. Three temporary timber bents will be driven for erection falsework.

The two trusses are on 29-foot 6-inch

(*Concluded on next page*)

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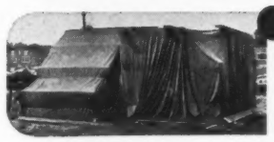

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High Bridge Is Built Across Little River

(Continued from preceding page)

centers, and are fixed at the center pier with a hinge on the land side of each of the other two piers. The roadway has a 15-foot vertical clearance measured to the bottom of the top bracing. Five longitudinal I-beam stringers support floor beams and a 7-inch reinforced-concrete deck slab. The 24-foot roadway is flanked on each side by a 2-foot 3-inch curb.

The approaches will have an 8-inch sand-clay base course, topped by a 20-foot bituminous single surface treatment with a liquid seal that will be applied by the prime contractor.

Quantities and Personnel

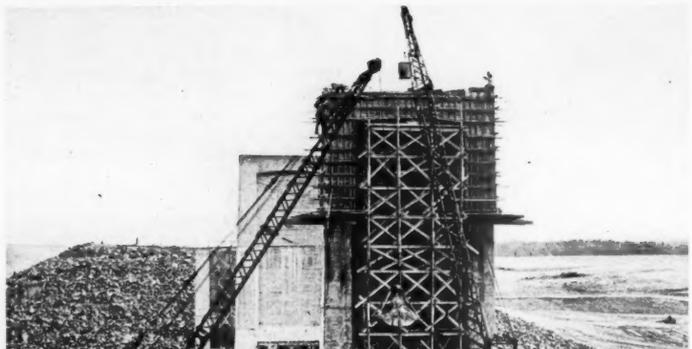
The major items in the bridge and approach contract include the following:

Earthwork	2,055,208 cu. yds.
Stone riprap	95,350 sq. yds.
Concrete	3,000 cu. yds.
Reinforcing steel	464,200 lbs.

At the peak of operations a force of approximately 150 was employed by the general and subcontractors on the project. Mac Edwards was General Superintendent for E. H. Hines Construction Co., Inc., and Robert E. Lee, Inc., the general contractor. The A. P. Tuck Construction Co., which built the piers, was represented by Claude Tuck, Superintendent. F. M. Ross was Superintendent for the Fred Ross Construction Co., which did part of the grading. The design was prepared by Patchen & Zimmerman, Consulting Engineers, Augusta, Ga.

For the Georgia State Highway Department, J. K. Ellis is Resident Engineer, assisted by W. B. Macken, Project Engineer. The project is located in Division 2 of which R. G. Ray, Jr., is Division Engineer with headquarters in Augusta.

The Department is headed by Jim L. Gillis, Sr., Chairman of the State Highway Board. M. L. Shadburn is State Highway Engineer, with C. W. Leftwich, Construction Engineer, and C. N. Crocker, Bridge Engineer.



Georgia State Highway Department Photo

A Northwest crane handles a concrete bucket to the last lift of pier 3. Pier 2 is completed and pier 1, in the background, is partly up.

Pile Hammers on the Job

A bulletin describing the methods of building the foundations and driving the piles for the Chesapeake Bay Bridge has been prepared by McKiernan-Terry Corp., 15 Park Row, New York 38, N.Y.

It includes a bird's-eye drawing of the bridge and its approaches, an elevation sketch of the bridge, and views. The latter show the methods of driving piles for the deep-water piers and suspension-bridge anchorages, and successive steps in the construction of the bridge.

The bulletin points out that 20 McKiernan-Terry single-acting and double-acting pile hammers and extractors were used by the four contractors for underwater pile driving, and in building the foundations for the bridge and its approaches.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 931.

Rusted-Metal Primer

A new metal primer for rusted surfaces is announced by Rusticide Products Co., 3125 Perkins Ave., Cleveland 14, Ohio. Directions for use, the company says, are to remove loose rust and scale with a wire brush, apply a coat of Ospho, let it dry, and paint.

The company explains that when Ospho is applied to rust, it causes the iron oxide (rust) to change chemically to iron phosphate, an inert, hard, dark-gray substance. Rust action is stopped and the subsequent paint attaches itself so tightly that moisture and oxygen cannot attack the metal.

Ospho is also used to prime new ferrous metal. When the metal is free from dirt, grease, and oil, a coat of Ospho produces a very slight etch of microscopic "hooks" for paint or other finishes to cling to. It is said to be equally effective for exterior and interior work.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 868.

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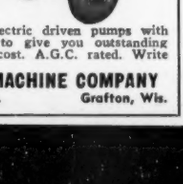

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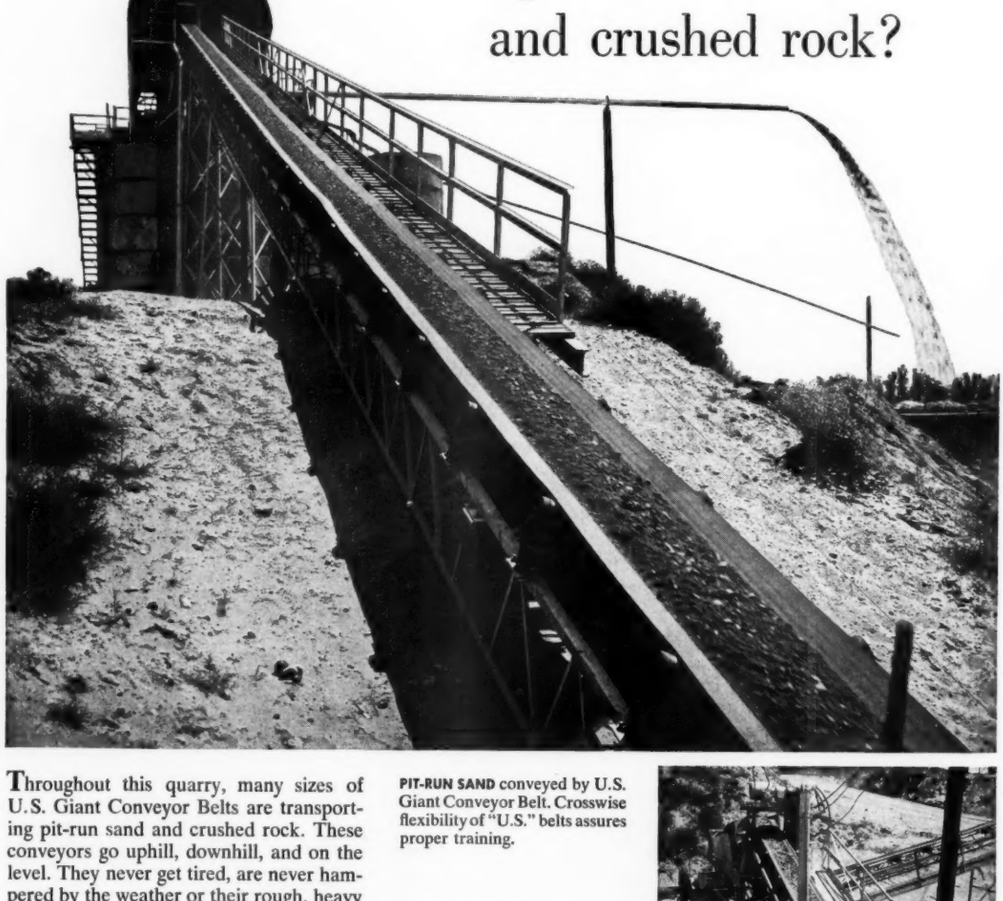

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County Forges Ahead With Road Program

Construction by Contract and Maintenance by Own Crews Keeps Kansas County Rolling on Hard Surface

• ON the south wall of the County Engineer's office in Kansas City, Kans., there hangs the license of a registered professional engineer. It belongs to one of the most unusual county engineers in the nation. For Clay Roberts, its owner, is an ex-contractor.

Now contractors have a way of solving tough problems in simple, forthright ways. Roberts' training along that line causes him to react in typical contractor fashion to many a problem in Wyandotte County, where he operates.

As every county engineer knows, he can't often pay skilled labor anything like the scales paid by local unions. Wyandotte County is hard up against that situation. For example, equipment operators get $2.77 an hour if they work for the union-scale contractors. They get $1.40 from the County, and workers in other crafts are proportionately paid. Good men are almost impossible for the County to hire; beginners quit when they get enough training to take out a union card. The turnover is terrific.

Recently, in the midst of that sort of situation, Roberts discovered that many of the 250 county bridges in the highway system were in a sorry state. A major reconstruction program was necessary. Roberts went to work and came up with a plan to get that work done by contract. By that decision alone he rid himself of the problem of help.

With characteristic contractor energy, Roberts busied himself standardizing the design of the new structures, which he planned to let in groups of 15 to 20 at a time. Everything over a 5-foot span is called a county bridge, so 20 of the small ones still won't be too big a job. The program was getting very close to the contract stage as this was written.

Program Forges Ahead

Slowly but surely, the County Road Department is forging ahead despite a shortage of money. As many as a dozen short construction projects a year are being done. Several major Federal-aid secondary roads have been completed. Contractors have recently finished some hot-mix topping on old county roads, and a contractor near Bonner Springs was getting ready, when we visited Wyandotte County, to erect structural steel on a new bridge. Consulting engineers are studying two of the six major bridges across the Kansas River, which bisects the county. The bridges are pretty far gone, too, and extensive strengthening and rehabilitation work remains to be done.

Wyandotte County never built up a large road maintenance department. Over the years, control of roads stayed largely in the townships. Much of it still remains there. So the Road Department is a peculiar combination of engineering and contracting, and grass-roots maintenance. Lately a county road gang and a bridge gang have been added to the Department to perform routine work on the county roads.

C. & E. M. Photo

Wyandotte County Engineer Clay Roberts (left) talks over a tough problem of Kansas road reconstruction with County Commissioner L. S. Maddox.

There are today some 47 miles of secondary roads, 150 miles of county highways, and about 400 miles of township roads. The secondary and county roads are practically all high-type hard-surfaced arterials. And many of the township roads now have bituminous penetration tops. More and more, residents of the Kansas county just across the river from Kansas City, Mo., are demanding dustless surfaces in the

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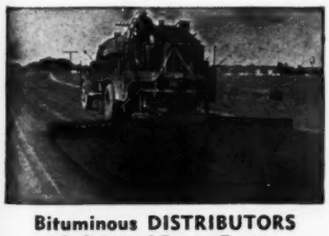

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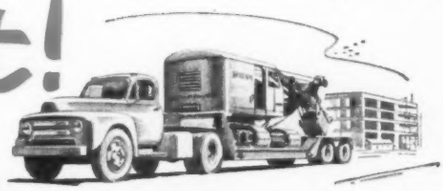

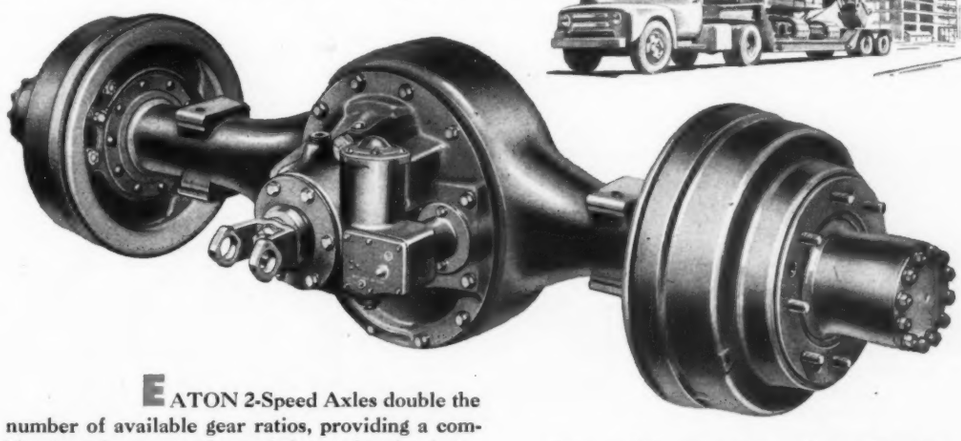

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County Forges Ahead With Road Program

(Continued from preceding page)

summer and relief from mud in the winter.

Roberts has established a close and satisfactory working relationship with engineers of the Kansas State Highway Department under R. C. Keeling, State Highway Engineer. The new work which is programed is being engineered, surveyed, planned, and the state's laboratory facilities used to an unusual extent.

New construction consists principally of highway widening, resurfacing with hot-mix, and in a few cases some road-mixing is being done. A 6-mile job of the latter type was completed in 1950. The subgrade was reshaped and recompacted, and granular ballast was put down. Then the road-mix aggregate was trucked in, windrowed by motor graders, and flattened. Approximately 5 per cent of MC-3 was added to the windrow, the blades mixed it thoroughly and laid it down. Pneumatic rollers compacted it in the usual manner.

Roberts, in office almost 2 years, has brought in a small force of engineers and technicians. He is training one young engineering graduate in the use of asphaltic concrete, since the County will go in for much of that material in the future.

Highway Maintenance

Highway maintenance for the most part is a township operation, although the "road gang" is now busy on county highways.

There are five townships in Wyandotte County: Prairie, Quindaro, Wyandotte, Delaware, and Shawnee. Three of the townships in the eastern part of the county are comparatively rich, while the others are comparatively poor. The budgets are never large. Prairie Township often receives as little as $17,000 a year for maintenance, while richer townships like Shawnee may go as high as $100,000.

Each township has a motor grader, usually a Caterpillar No. 12 or a comparable unit. Each township has a tractor-mounted front-end loader, a small dozer, and about 5 dump trucks. This equipment is used for routine maintenance.

Under what is known as benefit districts, highway betterment programs are financed in part by the property owners in the benefit district. When such a program is agreed on, the County pays 60 per cent of its cost; 25 per cent is financed by the township; and the benefit district pays the other 15 per cent.

Betterment programs consist of base-course strengthening, asphalt widening, seal-coat treatment, and other such standard forms of highway improvement. Down in some industrial areas near the county seat, some streets 53 feet wide have been paved with 8-inch portland-cement concrete, although this has usually been a contract operation. Roberts has a contractor's viewpoint about prices and the availability of materials. He gets RC-2 asphalt laid down on the road, for seal-coat purposes, for 13 cents a gallon. Cover material crushed down below ⅜ inch costs $2.95 per ton. There are three large commercial crushed-rock producers in the county who produce crushed Bethany-Falls limestone for the railroads. Roberts can buy all of this material he needs for $1.45 a ton, but he has to haul it to the road.

County maintenance crews have noticed a peculiarity of the older highways. Some of the old 18-foot roads built in the early 1920's are standing up well, and require little or no maintenance. They were built primarily of coarse-ground cement, and in those days nobody was too particular about the aggregate content. Yet these roads are holding up today better than some built of higher-type concrete.

According to Roberts, the Kansas Highway Department has noticed it too, and is building some experimental roads this year which simulate many of those old conditions of the '20's.

A small headquarters shop is maintained in the 160-acre tract where the County Hospital is located. Routine repairs are made there. Equipment is not pretentious, and maintenance of equipment consists strictly of lubrication according to factory recommendations and the replacement of worn parts.

Sewage Trouble

Wyandotte County has grown about 25 per cent in the past 10 years, and the population in and around the county seat exceeds that figure. Lately, with the influx of people, there has come another problem which threatens to be a tough one to solve: sewage.

Septic tanks and cesspools are becoming clogged, and in many cases drainage from these places runs down through open country. Kansas City dumps its raw sewage into the Kansas River, and the situation has become so alarming that the State Board of Health, working through the State Legislature, has set a time limit of 1961 for cities to handle their sewage problems in another way less polluting to state streams.

It is going to take all the forthrightness and tact which the County Engineer and commissioners can muster during the next few years to solve that problem. There seems to be only one solution: a major sewage-disposal system. The county seat lies on a long ridge between the Missouri and Kansas Rivers, and the unfavorable slope of terrain will make it necessary to build

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several separate disposal plants. Various estimates of cost go into the millions. Obviously much of the planning during the next few years will be directed at the sewage-disposal problem.

According to Roberts, one of the pleasant things about the post of county engineer is cooperativeness of the three commissioners with whom he works. They are L. C. Maddox, J. F. Reardon, and Cordell Meeks.

"They're nice men to work with", says Roberts. And that, coming from an old contractor who actually built some of the highway system he now administers, should carry some weight.

Completion in 1954 Is Goal for N. Y. Thruway

Nothing less than completion by 1954 of the entire 535-mile route from New York City to Buffalo is the objective of the New York State Thruway Authority, according to an interim report it has made to Governor Thomas E. Dewey. "Barring further restrictions on the use of materials resulting from a world-wide war, there seems to be no reason why this schedule cannot be successfully met", says the Authority.

The Thruway, more than a quarter of which will be completed or under construction by the end of the current fiscal year, is by no means a straightforward piece of road building. Along with some special problems, 525 bridge structures of various types will be needed along the route—the largest being the 3-mile-long Hudson River crossing between Tarrytown and South Nyack. Of these, 36 have been built, an additional 33 are under contract, and 36 will be placed under contract this year. There will be about 100 interchanges to feed traffic to and from the Thruway.

The report deals with varied phases of construction, right-of-way acquisition, landscaping, soil-mechanics problems, safety features, and traffic interchanges. Some 2,400 engineering personnel, employed either by the State Department of Public Works or by the 35 consulting engineering firms retained by the Authority, are engaged in Thruway survey or planning. During construction seasons a labor force of 18,000 men, skilled and unskilled, will be employed directly on the job, while the production of materials and equipment will employ an additional 20,000 men.

As to finance, approval this fall of a constitutional amendment permitting the State to guarantee Thruway Authority bonds, thus permitting the Authority to sell its bonds at approximately the same rate of interest as the State (under 2 per cent) would save $5,000,000 annually in interest costs. It would also reduce operating costs by $10,000,000 a year, since it would not be necessary to set aside that sum from annual revenues to create the large sinking fund required by insurance companies and others when investing in straight revenue issues.

Into the 535-mile roadway itself will go an estimated 500,000 feet of pipe, 7,300,000 barrels of cement, 2,000,000 cubic yards of sand, 4,000,000 cubic yards of stone and 92,000 tons of steel. The pavement will require 4,500,000 cubic yards of concrete.

Equipment-Repair Bodies Carry an Air Compressor

General-utility truck bodies designed to carry 105 and 160-cfm air compressors are described in a bulletin prepared by J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio. These units have provisions for carrying air compressors, plain hose reels or gear-type hose reels with cranks, tapping machines, jackhammers, paving breakers, tampers, fittings, and supplies. Compartment arrangements may be varied to conform to special needs. The bulletin illustrates many of the standard models available and gives specifications and a brief description of each.

This literature may be obtained from the company, or by using the Request Card bound in at page 16. Circle No. 859.

Allis-Chalmers Promotes

Executive changes on the staff of Allis-Chalmers Mfg. Co., Milwaukee, Wis., include the election of four new vice presidents. W. G. Scholl, former General Sales Manager of the Tractor Division, is Vice President in Charge of Sales for that division. In the General Machinery Division, C. W. Schweers, former Director of Sales, is now Vice President in Charge of Sales; J. F. Roberts, former Director of Engineering, is named Vice President in Charge of Engineering; while W. A. Yost, Manager of the Mechanical Power Department, is now a vice president of the General Machinery Division.

A fifth promotion is that of W. E. Hawkinson, hitherto Vice President, Secretary, and Treasurer of the firm, who is named Vice President in Charge of Finance, and Secretary.

Detachable Tape Hook

A hook for attachment to any Starrett ¼ or ⅜-inch-wide steel tape is made by The L. S. Starrett Co., Athol, Mass. It makes it easier to measure, unassisted, long pipe, casings, steel sheets, lumber, and similar materials. The hook is made from a brass casting with a nickel-plated finish, and its inner surface is serrated for a secure grip. The end of the tape is exactly aligned with and takes the measurement from the inside of the hook. A ring on the hook provides a convenient finger hold at the end of the tape.

The Starrett tape hook helps you measure long pipe, or whatever, when you have no assistant nearby.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 932.

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That's one of the many LaPlant-Choate Motor Scraper advantages earning money for Ralph E. Mills Co., Inc. of Salem, Virginia. On their Island Creek Dam contract, they are working four TS-300 Motor Scrapers eleven hours a day, six days a week to move 625,000 yds. of silty clay . . . *and maintaining an 18 mph haul speed average on 6 to 7% adverse grades!*

Combine this high-speed Motor Scraper performance with the big 17.5-yd. heaped capacity and big power that's *useable* in the pit and on the fill, as well as on the grades . . . add Motor Scraper dependability that keeps these units on the job hour after hour, day in and day out . . . and you'll see why more and more contractors are choosing LaPlant-Choate Motor Scrapers to set the profit pace on the toughest jobs.

WATCH THE HIGH-SPEED PERFORMANCE OF LPC MOTOR SCRAPERS WORKING NEAR YOU

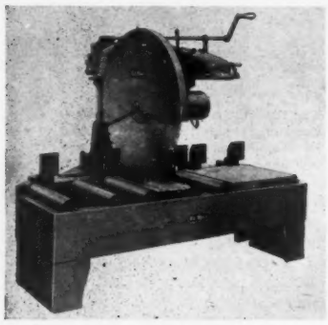
Get in touch with your nearest LaPlant-Choate distributor. He'll be glad to tell you where you can see TS-300 Motor Scrapers in action . . . watch their speed and power on the job . . . get facts and figures from the men who own and operate them. Ask your LPC distributor to explain all the features that make TS-300 Motor Scrapers first choice with so many cost-conscious contractors. And—while you're at it—ask him to give you all the facts on the TS-200, the speedy, powerful Motor Scraper in the 9 to 12 yard class. Stop in or phone today!

LAPLANT CHOATE
MANUFACTURING CO., INC.
CEDAR RAPIDS, IOWA, U. S. A.

Cable-operated Scrapers in 6-, 8- and 14-yd. sizes for all makes of track-type

2- and 4-yd. Scrapers for track-type and rubber-tired industrial tractors.

Hydraulic and Cable-operated Dozers.



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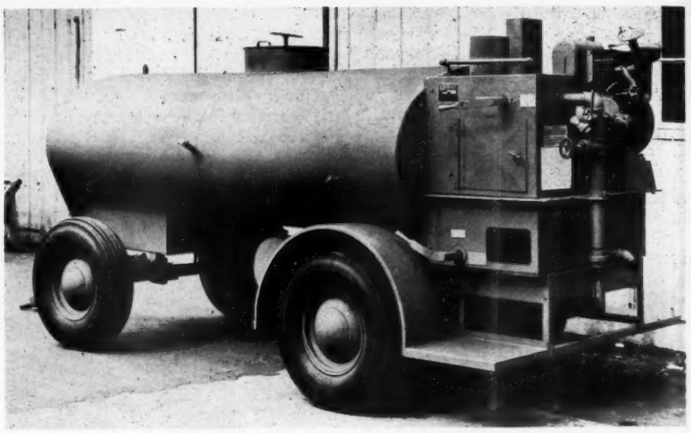

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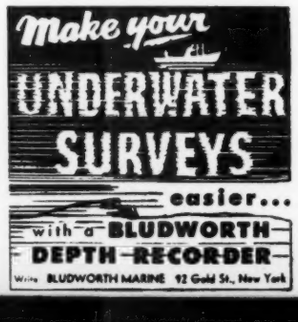

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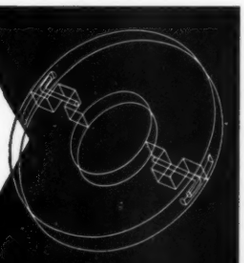

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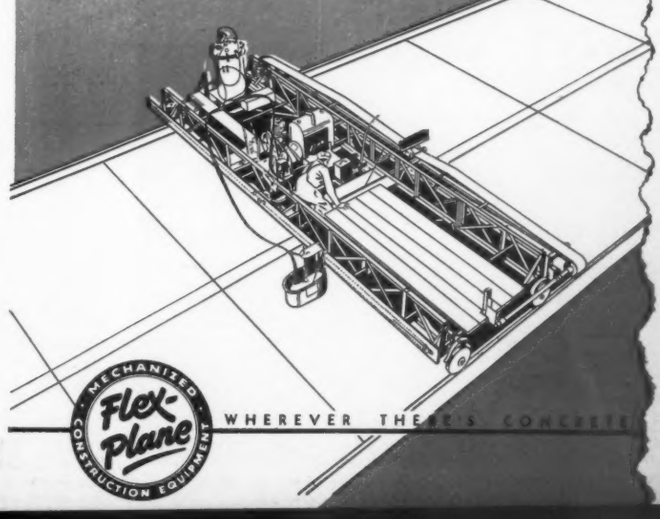

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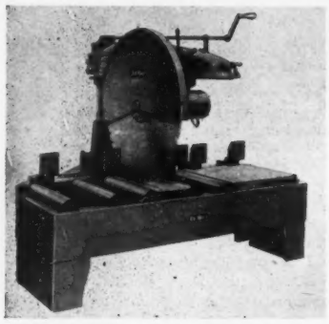

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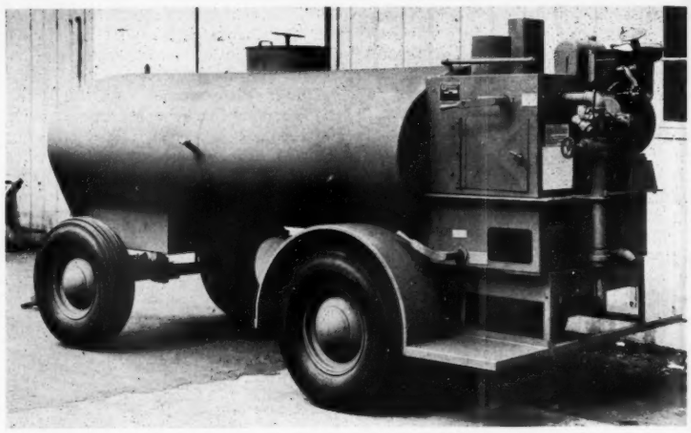

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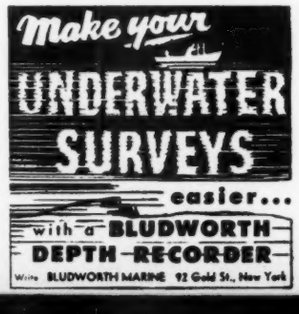

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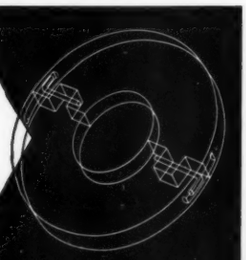

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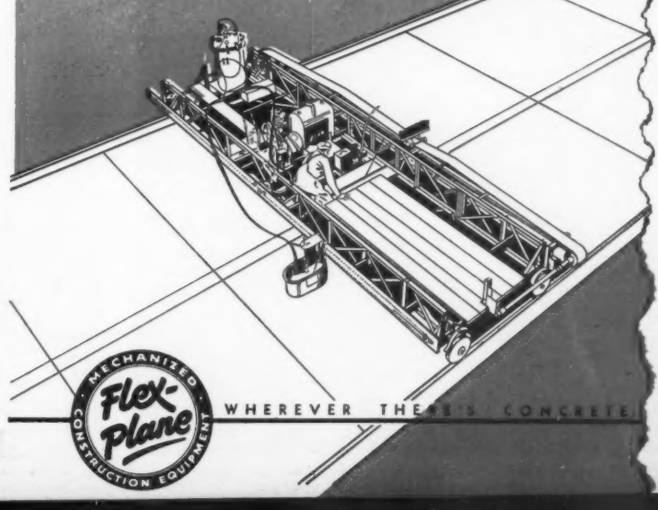

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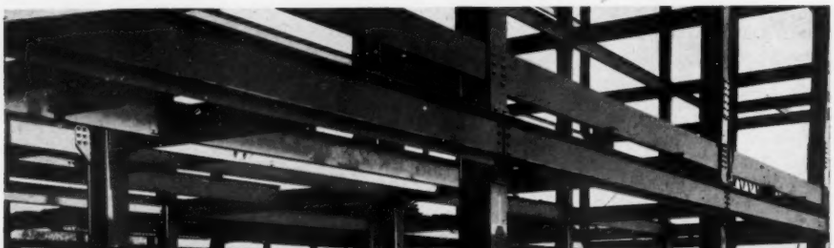

The day C&EMonthly visited Turner's office-building job in Wilmington, Steeltex floor lath was going in on the third floor to support the 2½-inch concrete slab (photo at left above). The second-floor level was partly poured (photo above) and a painter was painting the spandrel beam just below it.

C. & E. M. Photos

New Office Building For Wilmington, Del.

Turner Construction Co. Builds Modern 7-Story Structure With Steel Framework; Facing Is Marble and Brick

• A NEW home office for the Beneficial Loan Corp. is being constructed in Wilmington, Del., by the Turner Construction Co. The finance company, with more than 680 offices in 35 states and Canada, will have its headquarters in a modern 7-story building located on the northeast corner of Thirteenth and Market Streets. Construction got under way in the latter part of December last year, and the building is expected to be ready for occupancy early in 1952. The current steel shortage has hampered the progress of the work.

The building will have a 170-foot frontage on Market Street and a width of 50 feet. It will connect with the present 3-story red-brick building of the corporation, which was constructed on Thirteenth Street in 1936. This existing building is enclosed within the south end of the new structure. Its original dimensions offered a 43-foot frontage with a depth to the rear of 67 feet. About a third of the present building will be increased in height to 7 floors in order to blend with the new structure; the remainder will retain its present 3-floor height as a wing off the southeast corner of the 7-story building. This wing will measure 67 x 29 feet.

The structural-steel framework of the new building will be faced with alberene quarried stone up to the level of the second floor, and with pink marble above that on the street sides. The marble averages 1¼ inches in thickness, and is backed with 6-inch concrete blocks. At the rear of the building the facing is buff-colored brick. The new facing is continued along the front of the existing building on Thirteenth Street.

Concrete Foundation

An automobile-parking lot and several old houses formerly occupied the site of the new office building. After the houses were razed, the foundation was

(*Continued on next page*)

This interior shot shows the Ceco bar joists under the second floor. They are 12 to 14 inches deep and run north-south on 2-foot centers.

Here is the northeast corner of the building on Market and Thirteenth Streets—and the material-handling tower at the center of the Market Street side. McCormick Construction Co. erected the framework.

excavated by Citro & Sons, Inc., of Wilmington under a subcontract. Mostly sand and clay with a few scattered deposits of gravel, the material was dug out with a 1-yard shovel and loaded into trucks. A construction ramp at the north end of the site gave access to the street for the equipment. Part of the excavation was stockpiled at the rear of the property for use later as backfill, but most of it was hauled away and wasted.

Excavation proceeded from the north to the south end of the site, with the maximum depth of 18 feet occurring at the south end. The general contractor followed behind the excavation, driving timber sheeting along the street sides of the hole. Sheeting consisted of 3 x 10's or 3 x 12's, 12 to 18 feet long, backed with 12 x 12 wales top and bottom that were braced firmly in the ground. Soil in this area is firm and dry, and the banks were held in place without difficulty. As the excavation was carried down below the level of neighboring foundations, underpinning was used to support the walls and column footings of the existing finance company's headquarters. Adjoining the site on the north, the 3-story brick and stucco building occupied by the Old Age Welfare Commission was also underpinned.

Foundation walls of 12-inch reinforced concrete extend from the basement to the level of the first floor. They enclose concrete footings for the columns on 20 x 15-foot centers, the size of the bays. Footings average 7 feet 6 inches square x 2 feet deep. Those for the elevator shaft are the deepest, being constructed 7 feet below the level of the basement floor which is a 6-inch reinforced slab laid on a 2-inch mat of plain concrete topped with waterproofing.

Main-Floor Slab 12 Inches Thick

Wall and footing forms were built with 1 x 6's and 1 x 8's, backed with 2 x 4 studs on 16-inch centers, and double 2 x 4 or 2 x 6 wales spaced according to the loading. Richmond ties held the forms together. Transit-mix concrete, supplied by the Warner Co. with a plant at South Wilmington, was used throughout. Bethlehem Steel Co. furnished the reinforcing. Practically all the concrete for the foundation was chuted directly into the forms from the truck mixers parked on the adjoining streets.

The exterior of the foundation walls, as well as the 2-inch foundation mat, was waterproofed with a 3-ply membrane that was mopped on hot. For protection during the backfilling, the waterproofing material was covered with a coating of cement-sand-lime mortar.

From the footings, 30-inch-square, reinforced-concrete piers go up to the first-floor level. They support a heavily reinforced concrete slab 12 inches thick, which gives to the basement some of the protective features of a bomb shelter. In making the floor pour, adjustable Rooshores were set up in the basement on 3-foot centers both ways. Across their tops 4 x 6's were placed to support 3 x 4 joists on 12-inch centers. Plywood panels, ⅝ inch thick, laid on top of the joists served as forms for the slab. The pier forms were also built of plywood. Concrete for the floor pours was distributed from the truck mixers to the forms by six rubber-tired hand buggies. They were pushed over wooden runways.

Steel Framework

By April 23 of this year the foundation was completed and ready for the structural-steel framework. Bethlehem Steel Co. supplied the material, which was erected by the McCormick Construction Co. of Wilmington under a subcontract. Steelwork started on May 10 and was completed on June 19. All the members were placed by two cranes equipped with 100-foot booms working at ground level. Four gangs did the riveting. Columns are 10-inch H-beams of varying weights.

Across the steel floor beams, 12 to 14-inch-deep Ceco bar joists run north and south on 2-foot centers. Over them is laid Pittsburgh Steeltex floor lath supporting a 2½-inch concrete slab. For handling concrete placed above the level of the first floor, a 136-foot tubular steel tower was erected at the center of the Market Street side of the building. The transit mixers discharged their contents into a wooden hopper adjoining the tower at basement level. From this hopper, holding 5½ yards of concrete, the buggies were filled and then raised on the tower platform to the desired floor by a one-drum hoist.

The lift held two buggies, and the usual procedure was to load and lift two of the six buggies while two others were being dumped into the forms and the remaining two were on the way back to the hopper. With this system an entire floor slab was poured in a single day. Electrical conduits laid in the slab gave the proper depth for screeding. The structural slabs were topped off with a 1¼-inch cement-mortar finish and covered with asphalt-tile flooring material.

Air-Conditioned Throughout

C. O. Struse & Sons, Inc., of Philadelphia, Pa., is subcontractor on the masonry work, both marble and brick. The steel columns are enclosed within a veneer of alberene stone, with the windows extending for the full width between columns to provide the maximum of natural lighting. Hung ceilings are suspended from the bar joists and conceal the ducts for the Carrier air-conditioning equipment which services the entire building. Walls and ceilings are the conventional plaster type.

The new building will contain approximately 65,000 square feet of office space, with the Beneficial Loan Corp. occupying part of this space and renting the rest. The basement contains a boiler room with an interchangeable unit for using either oil or gas fuel. Also in the basement is the electrical switchboard, a storage area, and a bank vault for the finance firm.

On the main floor are Beneficial's public offices, entered from a lobby and foyer opening onto Market Street. The three elevators, serving all floors,

(Concluded on next page)

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MARMON-HERRINGTON
All-Wheel-Drive
FORDS

New Office Building For Wilmington, Del.

(Continued from preceding page)

are located at this central point of the building. Around the sides of the first floor are rows of stores. Because of the slope on Market Street these stores are not at the same level; the finished-first-floor elevation varies from 68.17 at the north end of the site to 76.38 at the south end. There is also a variation at the basement level. The elevation of the roof is 156.93, and above that is a penthouse containing machinery for the elevators and the air-conditioning equipment. This part of the roof area is a poured structural slab because of the heavier loading.

Plans for the building were prepared by Walter Carlson, a Wilmington architect, and its total cost is estimated at close to $1,000,000. An average force of 50 is employed on the project. Charles M. Peterson is Superintendent for the Turner Construction Co., whose Philadelphia office handled this contract, and Horace B. Nicholson is the architect's representative at the site.

Engineering Aspects Of Irrigation Work

Irrigation has long since left the knee-britches stage of small projects along stream channels, and become a modern applied science involving the design and construction of complicated hydraulic structures. The new book "Irrigation Engineering", authored by Ivan E. Houk, Consulting Engineer of Denver, Colo., will be of interest to many men in governmental and private practice. Volume I of this text treats agricultural and hydrological phases of irrigation in a comprehensive and up-to-date manner. The author supplies practical data essential to engineers, agriculturists, and others interested in engineering problems.

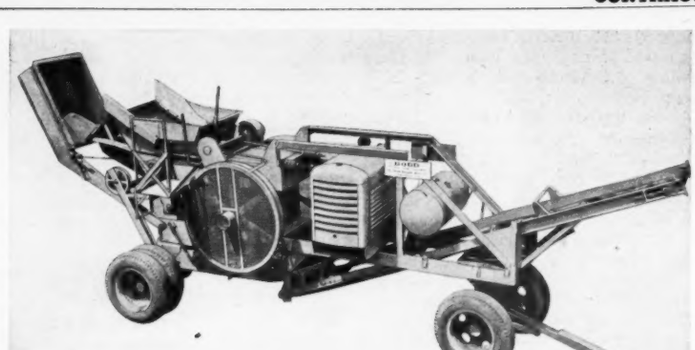
The data, principles, and methods outlined in the text treat both the development of irrigation and the maintenance of successful agriculture. Special attention is devoted to advances made during the past few years in such subjects as soil moisture, wilting conditions, snow surveys, runoff forecasting, return flow, drainage recoveries, use of water by crops, consumptive uses on large areas, irrigation efficiencies, erosion during irrigation, sprinkling, and other improved methods of applying water. It includes the basic information needed by engineering students planning to follow a career in this science, and digests of recent studies that practical engineers may find useful. Complete references at the end of each chapter permit the reader to continue on his own.

Irrigation engineers will undoubtedly find Mr. Houk's book of tremendous interest. He has been responsible in his 40 years of experience in the field for numerous technical, scientific, and engineering papers on irrigation, irrigation structures, arch dams, rainfall, runoff, reservoirs, and spillways.

"Irrigation Engineering", Volume I, is available from John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. The price is $9.00. Volume II on project planning and structures will be published later.

New Portable Plant Crushes and Screens

A new portable crushing and screening plant for rock or gravel operations has been developed by Union Boiler & Mfg. Co., Lebanon, Pa. The Dodd is 25 feet long, 92 inches high, 8 feet wide, and weighs 16,000 pounds. It has a rated capacity of 30 tons per hour of minus-1½-inch stone. Safety springs on the crusher compress if tramp iron gets into it.



The Dodd crushing and screening plant has a capacity of 30 tons per hour of minus-1¼-inch stone. Union Boiler & Mfg. Co., Lebanon, Pa., is the manufacturer.

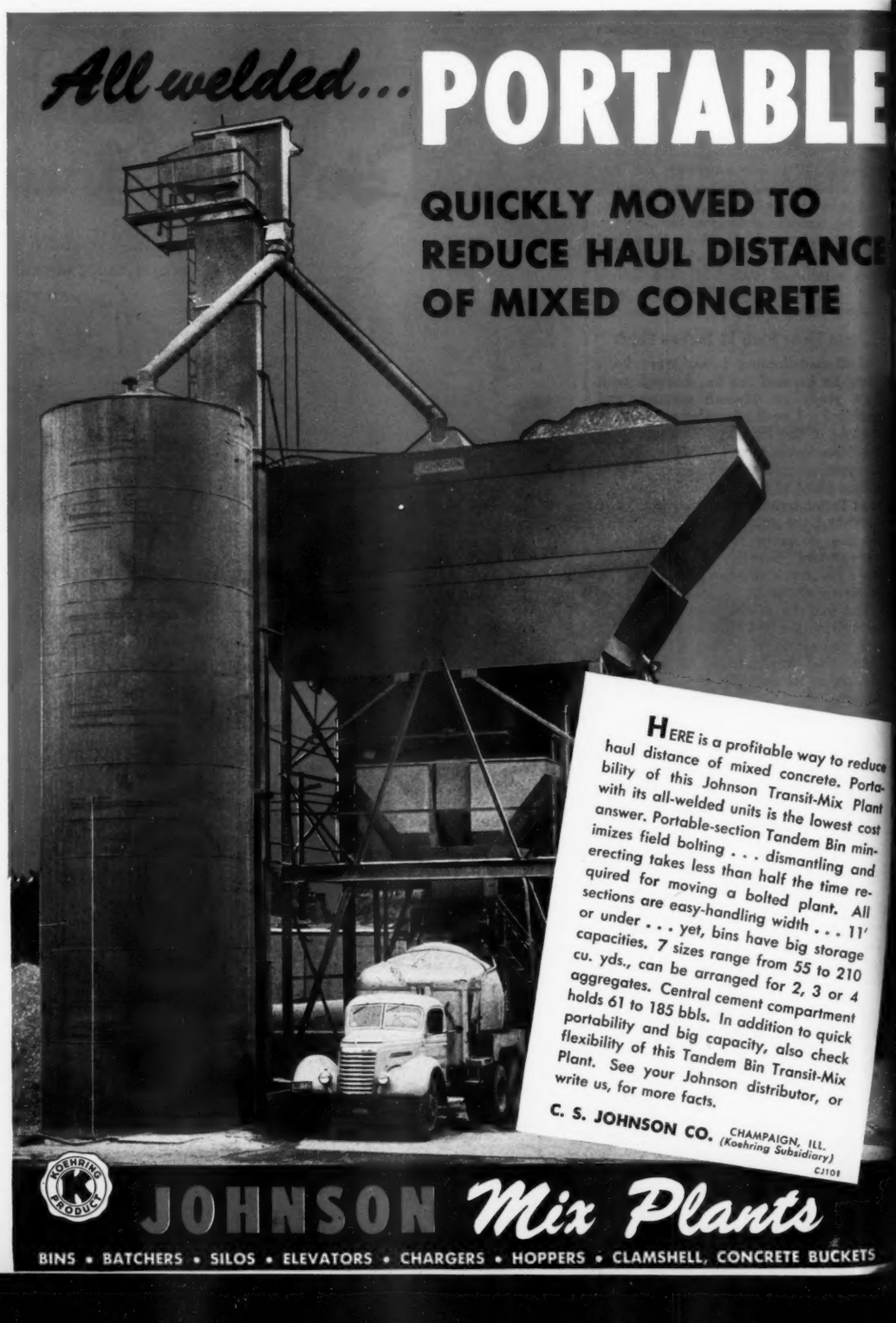
The unit is built around a Dodd triple jaw crusher with a jaw opening of 11 x 24 inches. Material is fed from a scoop which can be loaded at ground height. The sand and fine stones which pass through the grizzly by-pass the crusher and are delivered directly to the sizing screen which is suspended under the crusher. The stone passing through the crusher is also discharged onto the sizing screen. The screen can be set to remove both fines and oversize or can be adjusted so that all the material is delivered to the loading conveyor, the company says.

Further information may be secured from the company. Or use the Request Card that is bound in at page 16. Circle No. 875.

Finishing Trowel

A finishing trowel with plenty of knuckle room has been introduced by William Johnson Co., Kent and Brenner Sts., Newark, N. J. It is available in two sizes: 11 x 4¾ inches and 11½ x 4¾ inches. It has an oval-shaped basswood handle fastened on with a brass washer. The spring-steel, tempered, ground, and polished blade is lacquered to preserve finish. A strong malleable shank is fastened to the blade with five steel rivets.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 881.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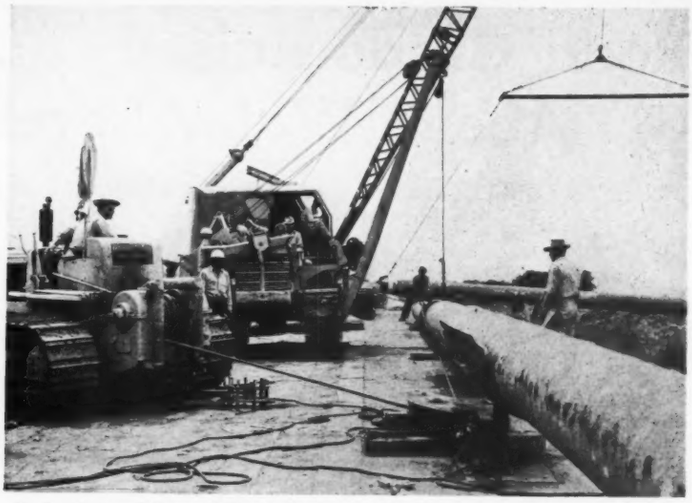
Pipelaying in Swamp Uses New Technique

A million dollars a mile, and possibly even more, is the estimated cost of the natural-gas pipeline that is being laid through the marshlands of the Mississippi River delta. This costly project involves the laying of 90 miles of line from oil wells at the mouth of the Mississippi to the new Kaiser Co. aluminum-reduction plant at Chalmette, near New Orleans, La.

The purpose of the project is to eliminate the high shipping costs connected with the production of aluminum. At present, high-grade bauxite ore has to be brought by boat from South and Central American ports and unloaded at Kaiser's plant in Baton Rouge, La., for primary extraction; for final reduction, it is shipped to the northwest, where there is plenty of electric power; then it must be shipped east again to the aluminum-using factories. So Kaiser decided to build a final-reduction plant at Chalmette, where low-cost natural gas is available to power turbines for electric generators.

Slap through the swampy Mississippi delta, the ditch for Kaiser's natural-gas pipeline heads for Chalmette, La.



On board a work barge at Pointe La Hache, a crane with a 70-foot boom lifts the pipe; a TD-18A boom tractor carries and holds it for welding; then a TD-14A uses its winch to force the pipe out from the barge.

The United Gas Pipeline Corp., which supplies most of the natural gas for the New Orleans area, got the order to furnish the gas for the new plant, but the volume required was so great that it decided to build a new line to tap the coastal oil wells which were burning off gas as waste. The first step was to plot the new line on the map. It begins at the Westbay oil field on the Gulf tidelands, crosses the Mississippi at Venice, La., heads north along the Gulf, often in open water, past Pointe La Hache and Delacroix to Chalmette. A feeder line extends across the river at Pointe La Hache to reach several oil fields to the west.

The installation of the line was undertaken by Brown & Root, Inc., Houston, Texas, and was started in the fall of 1950, when the river was low. The two river crossings were completed by February of this year, and then the pipelaying could begin. Three basic systems are being used in laying the pipe:

1. In the few places where the ground is stable enough to support International boom tractors, the job follows regular pipeline routine.

2. In sections too marshy for tractors, a lightweight dragline is used to gouge out a narrow trench for the pipe. A work barge anchors at one end of the trench, and the pipe is pushed out from the barge, in some cases as far as 5 miles.

3. In open water, where some of the islands drift with wind and tide, yet another method is necessary. A 36-foot-wide channel is dredged out, the pipe end is then anchored, and, as new sections of pipe are welded on, the whole barge is forced ahead like a boat being poled by a man.

Nearly the whole section of line goes through swampy terrain where no similar pipelaying has ever been attempted. One of the snags is that gas pipelines are lighter than water and float to the surface in marshy land. So they have to be held down by concrete coating. The 40-foot lengths receive first a ½-inch-thick coat of mastic material to protect the metal from ground acids and corrosion, then a layer of concrete 7/8 inch thick to bring the weight of a linear foot of 16-inch-diameter pipe to 152 pounds. Only then are they loaded on barges and towed to the job.

Work stoppage occurs only when low tides cause the barges to stick in the mud and the supply of pipe they can carry gives out. On these occasions, the crews get in a little fishing or alligator hunting while waiting for the water to rise.

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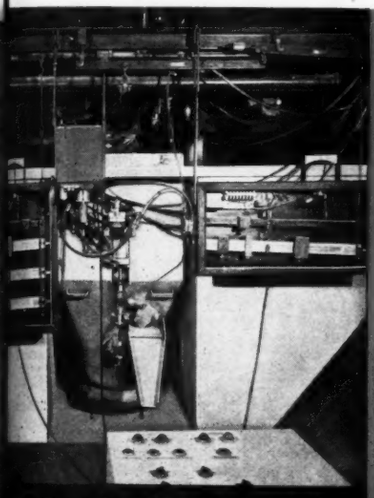

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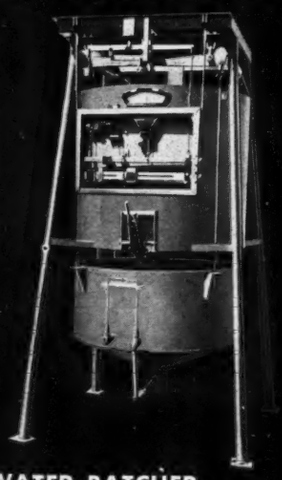
This exclusive Johnson Concentric Aggregate-Cement Batcher, with central cement feed is fully automatic, air ram operated. Finger-tip panel (shown in foreground) controls air rams on aggregate and cement fill valves and discharge . . . assures extreme accuracy at top batching speeds for most efficient use of materials. Batcher also can be furnished with manual controls. Aggregates arranged concentrically around cement prevents "gumming". Cement is weighed on separate scale; aggregates are weighed on individual beam scales . . . or on accumulative dial scale.



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Road Grade Raised Above Water Level

Million-Yard Dirt Project Combined With New Bridges to Carry U. S. 69 Through Oklahoma Reservoir

• CONSTRUCTION of a big dam in semipopulated areas usually entails supplemental work. Highways and railroads often have to be located on new alignment, houses have to be moved, and trees have to be cleared. Fort Gibson Dam near Muskogee, Okla., is no exception to that hard rule, and the placing of the last bucketful of concrete in the big Grand (Neosho) River barrier did not mark the end of construction work.

On U. S. 69 between Chouteau and Wagoner, work is under way to raise the highway roadbed beyond the high-water level of the reservoir which will soon be created behind Fort Gibson Dam. M. E. Gillioz, contractor of Monett, Mo., has a contract of approximately $1,000,000 with the Tulsa office of the Corps of Engineers.

The work, which is spread over about 15 miles of the main north-south highway, includes 1,000,000 cubic yards of grading from borrow, construction of two 3-span bridges and one 4-span structure, and a number of small culverts, one of which is a double 10 x 10.

L. & E. M. Photo

Pavement removal on U. S. 69. A Bucyrus-Erie Dozer-Shovel on an International tractor loads broken concrete into an I-H dump truck.

In one place the highway is being raised 34 feet. The bridges, which are from 200 to 300 feet long, are exceptionally high for that part of the state.

Contractor Furnishes Engineers

A somewhat unusual departure from Corps of Engineers procedure is the fact that routine field engineering is being furnished by Gillioz. The Corps of Engineers has a small force which makes the inspections, takes embankment and concrete samples, and makes the cross-section measurements for payments. But field staking and engineering is done by contractor engineers. Much of the sampling and testing is also done by outside independent laboratories.

Possibly one of the results of this arrangement is good progress by Gillioz. The Corps of Engineers contact allows 500 calendar days from April 1, 1951, for the completion of the work. But Gillioz expects to have the entire thing finished by December 1, 1951, using up less than half the alloted time. The record has also been possible because of an unusually dry run of spring weather.

Two dirt-moving subcontractors have also been employed to help speed that feature. Roark Construction Co. and Wood, Davis & Foster of Tulsa are on the job.

Concrete Comes First

Concrete work in the culverts, drains, and bridge substructures was one of the first project items to be done. Every covered structure was rushed to get it in far enough ahead of the earth-movers so equipment was not slowed down. The submerged portion of the old slab, which comprised about 7 miles of the 15-mile job total, had to be broken up and removed.

Pavement removal was done by a

(Concluded on next page)

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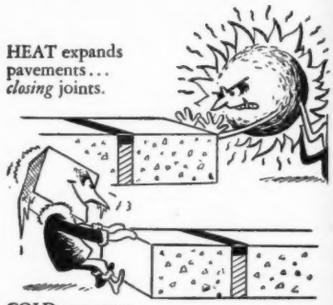

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Lorain crawler crane and a steel skull-cracker. As the machine broke up the old concrete slab, a Bucyrus-Erie Dozer-Shovel on an International tractor loaded the broken pieces to dump trucks which hauled them away. Some of the slab was reinforced, and welders had to cut the steel. Several bridges, demolished on the site in the same manner, sometimes required a few sticks of powder, particularly in some of the thick abutments.

Forms for the culverts and bridge structures were made in the field at the site. Facing for all exposed concrete was formed from ¾-inch plywood, nailed to 2 x 4-inch studs, usually at 16-inch centers. Dayton Sure-Grip snap ties were used to hold the forms from spreading.

There has been an enormous change in bridge-concreting work by Gillioz in the past few years. Not long ago a labor crew of 20 to 25 men was necessary. The operation is so completely mechanized today that only 2 men work around the concrete mixer.

The secret of elimination of manpower on this job was a small Winslow UniBatcher, which weighed the aggregates and sand and dumped them into the skip of a 16-S CMC mixer. No labor crew was necessary around the UniBatcher, because the hopper was fed by an Ottawa hydraulic loader mounted on the front end of a Minneapolis-Moline tractor. The operator on this machine was so good he could feed the material in until the weigh pointer came up to zero. One day the contractor who owns the outfit watched the machine charge the batcher for 30 minutes, and only two shovels of extra material were added.

All rock aggregates for the mix were contained in one pile. This material was trucked in by M. O. Weaver of Pryor, Okla. Sand for the mix came from Johnson Sand Co., Muskogee, Okla. Dewey air-entraining cement was used in the mix.

When the fresh concrete was turned out of the mixer, it was usually transferred to the forms by a 1-yard bucket on a Lorain Moto-Crane. Two small gas-powered vibrators did the concrete compacting.

The concreting was one of the most efficient small-pour operations in that part of the tri-state area of Oklahoma, Missouri, and Arkansas.

Three Dirt Spreads

The grading work has resolved itself into a more or less routine operation. The presence of two grading subcontractors automatically makes three equipment spreads on the project. Gillioz is doing the major work near the center of the project, including one large fill 34 feet high. Wood, Davis & Foster was assigned to the north end, and Jim Roark had the south end. Their contracts agree, "We'll keep working until we all meet".

Roark's equipment spread includes 5 Caterpillar D8's and a D7; 4 LeTourneau FP-type Carryalls; a LeTourneau and a Ferguson sheepsfoot roller; a DW10 and scraper; a D6 for pulling rollers; 4 water tank trucks; and a portable truck-mounted service outfit.

On Wood, Davis & Foster's spread, there are 3 DW19's with scrapers; 3 D8's and one TD-18 International with LeTourneau Carryalls; 1 Allis-Chalmers and 2 Adams motor graders; 2 D8 push cats; a TD-14 and TD-18 roller tractor; and an International TD-18-mounted Bucyrus-Erie dozer.

Gillioz has the biggest equipment spread of all. There are 4 Allis-Chalmers HD-19's with 20-yard Gar Wood scrapers; 3 Super C Tournapulls; 3 DW10's and scrapers; 2 sets of tandem Ferguson 112 rollers with HD-19's for pulling power; 2 Allis-Chalmers motor graders; 2 water trucks; two HD-19 pushers; an HD-19 dozer; and a new HD-15 machine with a Gar Wood dozer.

The earth-moving job consists of digging material from a borrow area east of the highway, and bringing it for short haul distances to the fill. The borrow material is sandy clay, silty clay, and some gumbo.

D. V. Smith, Gillioz' superintendent on dirt, has about 40 years' experience moving the stuff. While the three spreads work similarly, Smith has developed certain interesting rules over his outfit which guarantee production. For example, the borrow area could give a lot of trouble if heavy rains fell and the area was all opened up. Smith opens up only the area nearest to the embankment, and leaves the clay layer in place over the remainder of the borrow pit. Then he works his machines over about 120 feet, bringing them straight down to the highway through a combination of gumbo, clay, and silty clay. He leaves a sloping face in his borrow pit at all times. If it does rain, the moisture will not penetrate the clay, and what runs down to the low point will either soak away or can be worked around.

Smith likes to see about a third of his units loading in the pit, a third traveling to the fill, and a third dumping. "When you've got 'em going that way, you're moving dirt", is his idea.

He even has an empirical rule of thumb for compaction that may work a little too well, because the tests on his spread have consistently shown 95 and 96 per cent of Proctor density, when 90 is required. He knows that the clay takes a 14 to 16 per cent moisture content, so he makes sure his trucks get the water in. When his Ferguson sheepsfoot rollers ride up out of the material and leave a slick surface with the feet that still penetrate, Smith will bet a Stetson the density tests check out. And they always do. There have been few failures bad enough to require taking the material out and recompacting it, and they were not on his spread.

The outfits are moving an average of 14,000 cubic yards per day. Smith gets about 7,000 yards in a shift, while the remainder is divided equally between the two subs.

All three equipment spreads use mobile service units for fueling, lubrication, and maintenance welding. Smith has welded sideboards on his DW10's, which he always uses on the longer hauls. The other contractors are using theirs without the extensions.

Sharing field supervision with Smith is G. F. Hare, Superintendent over the concrete and bridge construction.

C. & E. M. Photo

Time out for the camera on the highway job near Fort Gibson Dam. Left to right: Subcontractor Jim Roark, Concrete Superintendent G. F. Hare, and contractor engineers Boone Jenkins and Paul Bay

Motor-Truck Bulletin

A 4-page bulletin shows the line of heavy-duty motor trucks made by Federal Motor Truck Co., Detroit 9, Mich. It illustrates many types of heavy-duty vehicles, including six-wheelers, and covers Federal gasoline and diesel engines, special heavy-duty construction features, and specifications on the complete line.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 889.

SNOW-REM
SNOW PLOW WAX
Carnauba and SILICONE
Makes snow removal faster, easier, cheaper.
SPECO, INC.
7308 ASSOCIATE AVE. • CLEVELAND 9, OHIO

dart
High Speed Concrete
VIBRATORS

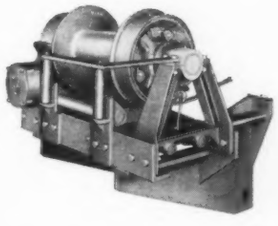
Dart Model 240 EP

LOWER OPERATING COSTS are proved by actual Case Histories of successful, enterprising Contractors! Whether you choose this sturdy electric model with wide voltage range or one of the rugged Dart gasoline models, you too will experience more low-cost, trouble free concrete vibration.

FREE Write for literature and the name of your nearest DART dealer now!

dart Manufacturing & Sales Co.
1246 Champa St. Denver, Colorado

Give your workhorse a WORKHORSE



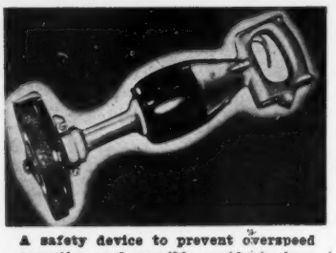
There is a Tulsa* Winch for every make and model of crawler tractor as well as all trucks. In capacities from 6,000 to 80,000 lbs., Tulsa Winch offers 28 different winch models to fit every winching requirement. If you operate crawler tractors manufactured by ALLIS CHALMERS, INTERNATIONAL HARVESTER, CATERPILLAR, CLETRAC, or any other popular make, consult your nearest Tulsa Winch distributor or write direct to

THE WORLD'S LARGEST MANUFACTURER OF TRUCK POWER WINCHES

Tulsa Winch
TULSA, OKLAHOMA DIVISION OF VICKERS Inc.

*Reg. U. S. Pat. Off.

815-35 E. FIRST STREET



A safety device to prevent overspeed operation and possible accidents is a feature of the new air grinder.

A New Air Grinder With Safety Device

An air grinder with a safety device to prevent overspeed operation and possible accidents has been announced by Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y. It is available for 8, 6, or 5-inch wheels, running at respective motor speeds of 3,100, 4,100, and 4,500 rpm. Over-all length is 24⅝ inches with a straight handle and 22½ inches with grip handle. The grinder has a maximum side-to-center distance of 2⅜ inches and weighs approximately 16½ pounds with guard.

The grinder contains a motor governor to maintain correct wheel speed and a built-in unit called the overspeed safety coupling. If the motor overspeeds because of governor wear, abuse, maladjustment, or dirty air, the overspeed safety coupling automatically uncouples the arbor and the grinding wheel from the motor, making it impossible to operate the grinder until the cause of overspeeding has been corrected.

Another safety feature is a multiple exhaust system. The operator can choose any one of four exhaust positions, spaced 90 degrees apart, and thus direct the exhaust away from the work and from his own body. A grip-type handle permits the grinder to be safely carried while connected to the air line. The grinder has a new-type rubber-faced throttle valve which is unaffected by oil or moisture. An independently mounted arbor, with bearings that are widely spaced and permanently lubricated, is said to give longer grinder life.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 892.

New Rope Resistant To Electric Shock

It is common knowledge that water is an excellent conductor of electricity, and that materials normally nonconductive will transmit electric shock when they are wet. The hazard of using wet manila rope near electric power lines has been appreciably reduced by the introduction of a new type of rope by South Eastern Cordage, N. B. C. Bldg., Cleveland 14, Ohio.

A special treatment applied to South Eastern's Se-Electric rope cuts down on its absorption of moisture and thus makes it safer to use. It was designed specifically for use in hazardous electrical areas.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 856.

Cable Connection Line For Electric Welding

A 12-page catalog describing a full line of cable connections for electric welding is offered by Tweco Products Co., P. O. Box 666, Wichita 1, Kans. It includes data on electrode holders, ground clamps, cable connectors, terminal connectors, cable splicers, mechanical and solder-type cable lugs, carbon electrode holders, and the new Lug-Set block and punch for attaching solder-type lugs to cables without solder.

The bulletin gives illustrations, specifications, and a list of parts and prices. It also contains information on the care and maintenance of electric welding cables and connections.

This literature may be obtained from the company by requesting Twecolog No. 8, or by using the Request Card at page 16. Circle No. 951.

New Drafting Aid

There's a new little gadget for holding paper to the drafting board—a small transparent adhesive disk about the size of a dime. The maker, Thompson Winchester Co., Inc., 201 State St., Boston 9, Mass., points out that the Stik-tack will adhere to wood, metal, glass, and other materials. It will not, however, stick to the fingers. It leaves no mark whatsoever on a surface and may be re-used many times, the company says.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 854.

Plastic-Faced Plywood

A 4-page folder describing PlyGlaze, a plastic-faced plywood concrete-form panel, has been prepared by St. Paul & Tacoma Lumber Co., Tacoma, Wash. Smooth concrete, long panel life, easy handling, and quick and easy stripping are features claimed for this product. The catalog points out that the plastic surface is permanently fused to exterior-type Douglas fir plywood, providing an overlay as strong, durable, and waterproof as the adhesives which bond the individual ply. Standard concrete-form panels are available in ½, ⅝, and ¾-inch sizes, 48 x 96 inches. Other sizes are available on request. Photos and technical data are included.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 915.

STA-VIS STARTING FLUID

Auxiliary Fuel for Quick Starting of Diesel Engines

- Prolongs battery life
- Saves time and money
- Sure fire starts
- Economical—price reduced

LARGE 24-OUNCE CAN ONLY $1.20

25-can case shipped prepaid

Distributor territories open—Write for information

STA-VIS OIL COMPANY St. Paul 2, Minn.

HARRISON COUNTY, KY. PLANT GETS 100 T.P.H. AND FLEXIBILITY WITH TELSMITH

Not only does Harrison County, Kentucky, have a thoroughly modern rock crushing plant—it exactly fits all the county's aggregate needs—turning out the variety of sizes and quality of product to meet all road specifications and, in addition, concrete stone and aglime. Designed and equipped by Telsmith—it has all the efficiency and flexibility of its commercial counterparts, including high capacity and low-cost operation.

Three Telsmith Crushers, of three different types—15" x 38" Jaw, No. 36S Gyrasphere, and 30" x 18" Double Roll—are the basis of this quarry plant's all-around versatility. Other equipment: Telsmith 36" x 10'-0" Standard-Duty Apron Feeder; 4' x 10' Telsmith Triple-Deck Vibro-King Screen; and two Telsmith BG Conveyors, 126' x 18" and 54' x 18".

Do you want the capacity, flexibility and economy that pays profits? Then get a quarry plant *engineered by Telsmith*. Send today for descriptive Bulletin 266.

Q-24

SMITH ENGINEERING WORKS, 4014 N. HOLTON ST., MILWAUKEE 12, WISCONSIN

Cable Address: Sengworks, Milwaukee

51 East 42nd St. New York 17, N.Y. · 211 W. Wacker Drive Chicago 6, Ill. · 713 Commercial Trust Bldg. Philadelphia 2, Pa. · 238 Main Street Cambridge 42, Mass. · Boehck Eqpt. Co. Milwaukee 3, Wis. · A. N. Wiglo, 294-6 N. Roosevelt Ct. Columbus 9, Ohio

Clyde Equipment Co., Portland 9, Ore., & Seattle 4, Wash. • Minos Eng. & Eqpt. Co., San Francisco 4, Calif. • Interstate Equipment Co., Statesville, N. C. • Rish Eqpt. Co., Charleston 22, & Clarksburg, W. Va.—Roanoke 7, & Richmond 16, Va. • Wilson-Wessner-Wilkinson Co., Knoxville 8, & Nashville 6, Tenn.

Distributor Doings

Caterpillar Dealers Get Together

Perfect weather and plenty of golf, sailing, swimming, and fishing contributed to the fun at an outing arranged by the Northeastern Caterpillar Distributors Association at Cape Cod on September 14 and 15. Representatives from each of the Caterpillar distributors in the northeastern area, together with manufacturers of allied equipment, attended the meeting at the Oyster Harbor Club, Osterville, Mass.

In spite of sporting distractions, the members of the party fitted in some important business discussions and saw two films showing the Martin gooseneck trailer in operation and the Do-Mor elevating grader loading trucks and Caterpillar wagons. Among the subjects discussed, that of most immediate concern was the question of priority ratings, and Caterpillar Tractor Co. emphasized that DO-ratings should be requested on all orders. The rise in the demand for Caterpillar parts has been a headache for dealers ever since the start of the Korean war and Caterpillar proposes to take care of this by the expansion of the Parts Department by over 1,000,000 square feet. R. W. "Bob" Cleveland, of the Cleveland Bros. Equipment Co., tackled the problem of used equipment and suggested that a separate department be set up by distributors to buy, sell, recondition, and rebuild used equipment, headed by the smartest individual the dealer could locate.

The committee in charge of the outing consisted of John E. Perkins, President of Perkins Milton Co.; Ted Southworth, President of T. Southworth Tractor & Machinery Co.; and Stuart Wade, Vice President of H. O. Penn Machinery Co., assisted by R. C. Nixon and J. J. Sullivan.

Metalweld, Inc., Handles More

An addition to the lines of equipment handled by Metalweld, Inc., 2617 W. Hunting Park Ave., Philadelphia, Pa., is announced by the firm. Metalweld is now exclusive distributor for all ESCO construction equipment made by Electric Steel Foundry Co., Portland, Oreg., and Danville, Ill. This includes dragline buckets, dippers, Fast-back hoe dippers, blades, box-type points and adapters, orange peel rock buckets, etc.

Christofferson for Melvin Pine

R. W. Christofferson has joined Melvin Pine & Co., Inc., 80 Broad St., New York, N. Y., distributor of construction equipment, as Export Manager of the firm's Road and Airport Construction Equipment Department.

For 11 years previous to his new appointment, Mr. Christofferson, who is an engineer, was General Manager of the Industrial Equipment Co., Oakland, Calif., one of the Kaiser organizations. Before this, he spent 9 years with Siems-Helmers, Inc., St. Paul, Minn., engaged in various construction projects, and became that company's West Coast Manager.

Winner Got His Entry Blank From Salt Lake City Dealer

The winner of the Essick mixer-naming contest, run by Essick Mfg. Co., Los Angeles, Calif., is Ted Sorensen, contractor of Orem, Utah.

Among thousands of names, Mr. Sorensen's entry—Essick Junior—was judged the winner. Though several other contestants submitted the same name, Mr. Sorensen's bore the earliest postmark. This lucky break was due to

(*Continued on next page*)

Ted Sorensen (left), of Orem, Utah, looks happy with his new Essick Junior—but no happier than Stan Omer of Lund Machinery Co., Salt Lake City, who gave him the entry blank for Essick Mfg. Co.'s mixer-naming contest.

ROAD BUILDERS — IT'S SENSATIONAL!
DRAGS **PECKERWOOD** DRAGS
STEEL SPRING WIRE ROAD BROOMS
MADE IN ANY C-O-N-T-I-N-U-O-U-S LENGTH UP TO 12 FEET
WIDTH 6 INCHES—IT'S DIFFERENT
ASSEMBLE YOUR OWN—IN ANY SHAPE REQUIRED—IN MINUTES, NOT HOURS
NO FRAME REQUIRED
MADE WITH KILN DRIED 6" WIDE HARDWOOD AND HEAVY SPRING STEEL WIRES TRIPLE OUT EACH HOLE. NOT STAPLE SET
THIS IS IT!
ORDER NOW

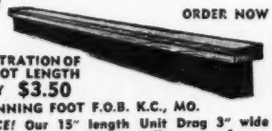
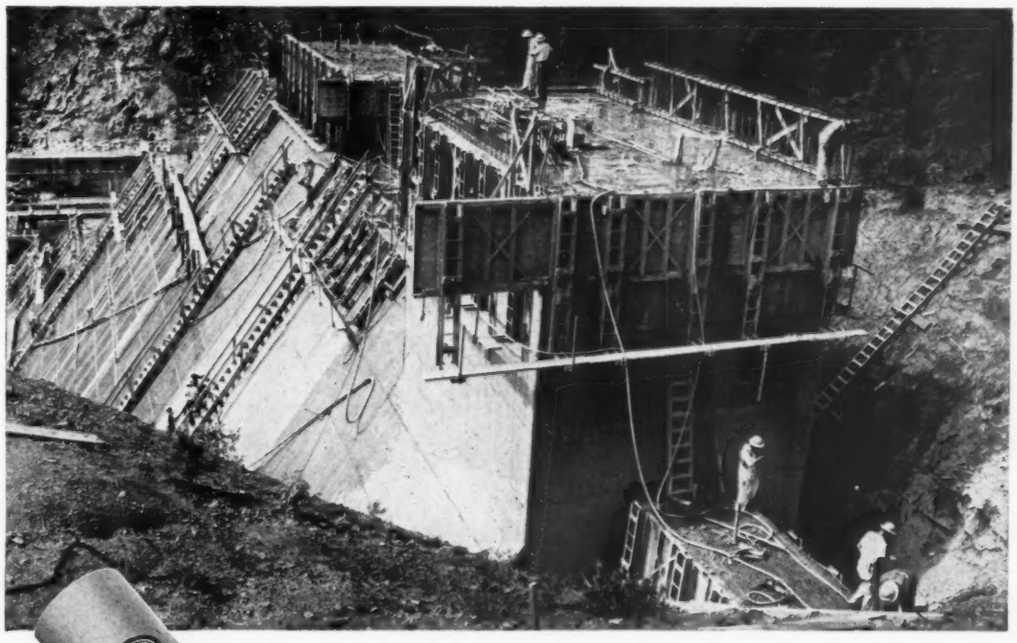



ILLUSTRATION OF 10-FOOT LENGTH
ONLY $3.50
RUNNING FOOT F.O.B. K.C., MO.
NOTICE! Our 15" length Unit Drag 3" wide with the two bolts that fits your frame, still $2.50 ea.
SINCE 1928 VAN BRUSH MFG. CO.
327 SO. WEST BLVD., KANSAS CITY 8, MO.



CHAMPION AIR DRILL HOSE
A super service hose of braided construction on oil-resistant tube, a strong flexible carcass and shock-resisting cover.

CHAMPION WATER HOSE
Top quality hose of wrapped construction, built with specially reinforced carcass, a smooth, friction-reducing tube and a rugged outer cover that provides maximum protection against external damages.

Philpott Dam finds solution to difficult Water and Air Hose problems

● Air and water hose, used in the Philpott Dam construction, came up against every enemy in the book. Changeable Virginia weather weakened hose resistance to high pressure loads, abrasive concrete structures clawed away hose covers, and the rocky terrain made deep, stabbing, carcass-penetrating wounds that caused sudden breakdown and work stoppage.

Ordinary hose wouldn't meet these challenges. Engineers, faced with rigid work schedules, couldn't put up with interruptions. They called in the local Republic Rubber Distributor, who, after a thorough study of all hose hazards, recommended use of Republic's Champion Air Hose and Republic's Champion Water Hose.

9,000 feet of these standard-built (not custom-made) pressure carriers went into immediate action for Philpott engineers who say Republic hose eliminated work stoppages and cut maintenance costs to absolute minimum.

Republic Rubber Products produce results like this for men in every industry. There's a complete line of Hose, Belting, Packing and Molded & Extruded Products. Just drop us a card regarding any one of these products.

INDUSTRIAL RUBBER PRODUCTS BY
REPUBLIC RUBBER DIVISION
Lee Rubber & Tire Corporation
YOUNGSTOWN, OHIO

Distributor Doings

(Continued from preceding page)

a timely call he made at the Lund Machinery Co., Salt Lake City, for the purpose of getting spare parts for his Essick 250-D. Stan Omer, salesman at Lund, promptly handed over an entry blank for the contest. Mr. Sorensen did some quick thinking—and now he is the proud possessor of three Essick plaster and mortar mixers. Apart from the new Junior, he has his 250-D and a 141-S Speed-Mix he bought from Lund Machinery Co. in 1944.

Distributor Firm Changes Name

Engineered Sales, 924 Alamo National Bldg., San Antonio 5, Texas, announces a change of name. The firm is now Closner Equipment Co., though it retains the same address. Closner Equipment is distributor for Barber-Greene, Straub Kue-Ken, Mathews, Hy-Way, Wickwire, and other equipment.

New Upstate Office for Reiner

Completing its first quarter-century, John Reiner & Co., 12-12 37th Ave., Long Island City, N. Y., distributor of construction machinery and implements, has opened a new branch office at Syracuse, N. Y. Located at 726 W. Hiawatha Blvd., the new branch will supply the entire Reiner line to upstate dealers. The Syracuse office is backed up by a dealer sales division handling distributor lines exclusively. The division maintains 10 salesmen in the field and its executive personnel includes John Merk, General Manager; Arthur Miller, Sales Manager; George Gale, Syracuse Branch Manager; and Felix Dausch, Parts and Service Manager.

In addition to its distributing activities, Reiner manufactures diesel generating sets, diesel marine auxiliary units, and gasoline and diesel-powered oil-field utility rigs.

E. F. Craven Co. Expands

A new sales and service building on S. Elm Street Extension, 5 miles from Greensboro, N. C., was opened last spring by E. F. Craven Co., distributor of road machinery.

The company moved three lines of equipment—General Motor diesel engines, Wisconsin engines, and Disston chain saws—to the new building, which will be used exclusively for the sale and servicing of these three lines. It contains 15,000 square feet of floor space and includes modern facilities for the storage of parts, together with the latest shop equipment. The building is under the supervision of W. C. (Bill) Craven, Manager of the Shop and Parts

(Continued on next page)

Members of E. F. Craven Co.'s Sales Department stand in front of the new building. Left to right, front row: George Bradham, Wesley Inman, A. K. Jackson, Joe Bostic, E. F. Craven, John Dixon, Millard Mayes, Ken Halstead, Herschel Williams. Second row: Duval Craven, Bill Hinton, Carl Baggette, Charlie Hines, Jr., Ben Russell, Dave Parker, Julius Phipps, Peyton Neal, Wirt Branson.

SAMSON BAR CUTTERS

- All Steel Construction
- Unbreakable Frame
- Easy Operation
- Immediate Shipment

Write for catalog of Metal Working Equipment

CAPACITY	No. 20	No. 23	No. 26
Rounds	5/8"	3/4"	7/8"
Squares	1/2"	5/8"	3/4"
Flats	2"x1/4"	2 1/2"x5/16"	2 1/2"x3/8"
Concrete Bars	3/8"	1/2"	5/8"
PRICE	$44.90	$60.30	$68.50

f.o.b. New York, subject to change

JULIUS BLUM & CO., Inc.
Established 1910
538 West 22nd St., New York 11 • WAtkins 9-7042

"Your Rammer is the Answer to a Contractor's prayer"

...writes
G. L. "Bud" Plant, Contractor,
SALT LAKE CITY • UTAH

SELF-CONTAINED
PORTABLE
ONE MAN OPERATION
FASTER COMPACTION
BETTER COMPACTION
LOWER INITIAL COST
LOW OPERATING COST
EASY TO USE, SAFE!

"THE engineers picked an area with a clay material on which no one had been able to get satisfactory compaction without bringing in select material to mix with the clay," writes G. L. "Bud" Plant, Salt Lake City contractor, in reporting on current construction of an ordnance proving ground in Utah. He continues, "To make a long story short, the 10" lift with two passes was 97.5% compaction . . . *your rammer is the answer to a contractor's prayer* . . . we are putting in an average of about 200 cubic yards (compacted measure) per 9-hour shift per rammer."

If you are not already using the Barco Rammer for soil compaction work, find out about it today! Ask for the nearest Barco Distributor to give you a demonstration. Catalog and information on request. *Worldwide Sales and Service.* BARCO MANUFACTURING COMPANY, 1818M Winnemac Ave., Chicago 40, Illinois. *In Canada:* The Holden Co., Ltd., Montreal, Canada.

BARCO
"Pegson" Gasoline
RAMMER
For Soil Compaction Close to Walls, Culverts and Abutments — in Trenches, Ditches

FREE ENTERPRISE — THE CORNERSTONE OF AMERICAN PROSPERITY

Distributor Doings

(Continued from preceding page)

Department, and J. R. Williams serves as Sales Manager of the three lines of equipment.

E. F. Craven's headquarters remain at 401 Morehead Ave. in Greensboro.

Cleco Names More Distributors

The Cleco Division of the Reed Roller Bit Co., Houston, Texas, announces the appointment of two new distributors for its Cleco and Dallett lines of air tools and accessories. The distributors are Dawson MacDonald Co., Inc., 141 Pearl St., Boston, Mass., and Louisville Mill Supply Co., Louisville, Ky.

Smith, Inc., of Fargo Promotes

A new vice president and two new sales managers have been elected by Smith, Inc., Fargo, N. Dak., distributor of trucks and construction equipment.

Leon H. Niles, Controller of the Fargo company and its two subsidiaries, Nodak Ford Tractor Corp. and the Soren Corp., is now a vice president of the parent corporation. He has been with Smith since 1946.

F. M. Hermanson, since 1950 Manager of the Used Equipment Clearing House, will, in addition, fill the newly created post of Regional Sales Manager of Construction Equipment covering the states of South Dakota, Nebraska, and western Iowa. A. W. Bartels assumes the position of Sales Manager of the Truck and Bus Division, succeeding B. J. Diederich, who has resigned. Mr. Bartels joined the company in 1945.

Bucyrus-Erie Dealer in Arizona

State Tractor & Equipment Co., 407 S. 17th Ave., Phoenix, Ariz., distributor of construction, mining, and industrial machinery, has been appointed Bucyrus-Erie distributor for the state of Arizona. The equipment manufactured by Bucyrus-Erie Co., South Milwaukee, Wis., which the company will handle includes ⅜ to 4-yard gasoline, diesel, and electric excavators, 2 and 3-ton Hydrocranes, and the H-3 Hydrohoe.

New Distributors for Waco

The Mid-South Equipment Co., 1305 W. Capitol, Little Rock, Ark., has been granted exclusive rights in the state of Arkansas for Waco sectional steel

(Concluded on next page)

At the mid-August National Sales and Service Convention of the American Tractor Corp., Churubusco, Ind., staff members of ATC and distributors of its equipment pose with the new GT-30 Terratrac. James Cougler of Track Equipment Co., Chittenango, N. Y., has a comfortable seat on the tractor's shoes.

Leon H. Niles, newly elected Vice President of Smith, Inc., equipment distributor of Fargo, N. Dak.

Ask the men who live with wire rope...

They insist on genuine

CROSBY CLIPS

Drop-forged
Hot dip galvanized
SIZES FOR ALL WIRE ROPE
DISTRIBUTORS EVERYWHERE

AMERICAN HOIST & DERRICK CO.
ST. PAUL 1, MINNESOTA

Network of Bethlehem Reinforcing Bars in deck of highway bridge over Lehigh Valley Railroad near Pittston, Pa.

New Bridge on Pennsylvania's Route 5

One of many relocation projects recently carried out for the Pennsylvania Department of Highways was a short stretch of Pennsylvania's Route 5, between Port Blanchard and Pittston, Pa. The job involved the construction of a two-lane bridge, plus approaches, to carry traffic over tracks of the Lehigh Valley Railroad. The new structure, shown in the accompanying photographs, was built adjacent to a narrow, outmoded bridge. Contractor: Wagner Construction Co., Kingston, Pa. Bethlehem furnished bridge reinforcing, bar mats, and dowel units.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Rigged with heavy wire rope, crane lowers bucket of concrete over bridge form.

STEEL FOR HIGHWAYS

Dowel Units • Reinforcing Bars • Bar Mats • Guard Rail
Guard Rail Posts • Wire Rope and Strand • Pipe
Hollow Drill Steel • Spikes • Bolts and Nuts
Timber Bridge Hardware • Tie-Rods
Sheet- and H-Piling • Fabricated Structural Steel

BETHLEHEM STEEL

General view of construction, as seen from caboose. Form at right is readied for pour. Narrow, outmoded bridge is visible at far side of form.

Workmen place Bethlehem Hinged Bar Mat over first course. Bethlehem Dowel Unit, designed to minimize load-transfer problems, is shown in foreground.

Distributor Doings

(Continued from preceding page)

scaffolding, according to an announcement by Wilson-Albrecht Co., Inc., Minneapolis, Minn. The Little Rock firm will handle the complete Wilson-Albrecht line of scaffolding, mason and scaffold jacks, material-hoisting towers, and portable elevators.

The Baldwin Supply Co., 519 Peters St., New Orleans, La., has exclusive rights for Waco equipment in Louisiana and northern Mississippi. The firm will handle the complete Waco line of sectional steel scaffolding, mason and scaffold jacks, material-hoisting towers, and portable elevators.

Dealers—this is your department, so send us your news—new plants, new lines, new staff appointments.

Pennsylvania Company's 25 Years

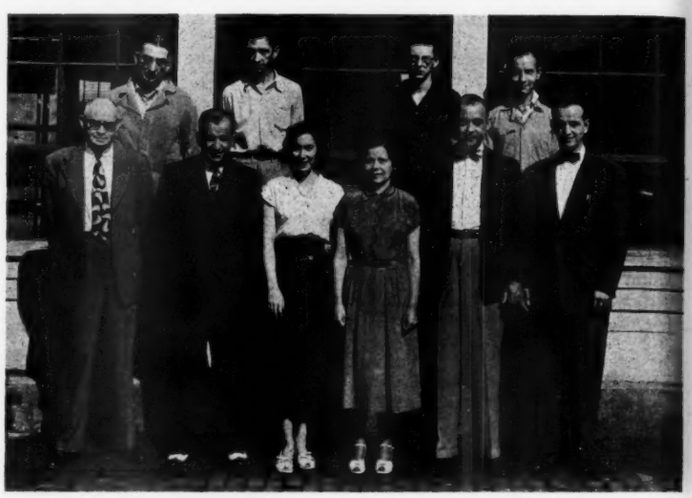
Silver-anniversary celebrations are in order for Ensminger & Co., Wilkes-Barre, Pa., distributor of construction equipment. An expansion program which got under way last year helps to highlight the 25th year of this firm, which opened offices in 1926 with three accounts and today handles twenty. Ensminger & Co.'s present 2-story office is located at 57 Wood St., Wilkes-Barre, and behind it an all-steel shop building was erected last year. A warehouse completes the buildings owned by the firm.

R. F. Ensminger, senior partner, practiced engineering from 1911 until he started his present company. On one of the jobs he held in the early days—a 2½-mile stretch of concrete tunnels for the New York City aqueduct—he had the idea of taking parts from a Stanley Steamer automobile to build a small locomotive for hauling concrete to the aqueduct.

The company distributes all kinds of construction machinery and supplies, including the complete line of Huber road maintenance equipment. The firm has handled this acount for the past five years, over territory covering 16 counties in the northeastern section of Pennsylvania.

On the firm's staff of 12, key members are Charles Yarrish, junior partner; William J. Littleton, Parts Manager; Steve Vino, Assistant Parts Manager; and Miller Garnet, Chief Mechanic.

Ensminger & Co.'s main office is the 2-story frame building in the foreground. Behind it, at right, is the new all-steel shop building added last year.



Most of Ensminger's personnel posed for this picture. From left to right, in the front row: R. F. Ensminger, Lawrence McKelvey, Colleen Judge, Betty Meighan, Thomas Weidow, Charles Yarrish. In the back row: Miller Garnet, William Littleton, Fred Scheihing, and Daniel Fedor.

Steel Corp. Mgr. Named

William Zwicker has been appointed Manager of the Structural Steel Division of National Steel & Shipbuilding Corp., San Diego, Calif. Formerly head of the Los Angeles Sales and Engineering Office of the company, he succeeds Otto Tatus, who died on August 8. Mr. Zwicker has been connected with National Steel since 1940 and has headed the Los Angeles office since its establishment in 1945.

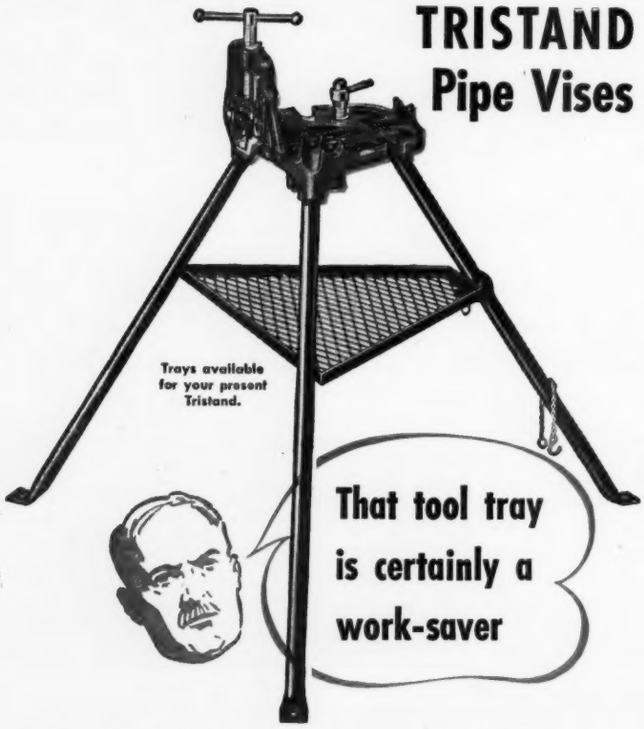
Catalog on Dipper Buckets

An 8-page catalog on all Ecso dippers is offered by Electric Steel Foundry, 2169 N. W. 25th Ave., Portland 10, Oreg. It describes the Esco general-purpose cast-welded dipper, all-cast manganese-steel dipper, and the Fastback Hoe dipper. It contains model illustrations, concise specifications, and recommendations, as to which dipper will perform most economically under certain digging conditions.

This literature may be obtained from the company by requesting Catalog No. 189, or by using the Request Card at page 16. Circle No. 885.

Handy work bench is a Bonus!

WITH RIGID TRISTAND Pipe Vises



• It's right there when you need it—the handy workbench built into every Tristand. New tray keeps tools at your fingertips—less stooping, easier work. Tray makes Tristand rigid—won't fold up in use. Legs have rubber feet to prevent travel. LonGrip tool-steel jaws won't slip, won't mar polished pipe and tubing. Yoke vise, 2½" capacity; chain vise, 4". Buy these new work-saver RIGID Tristands at your Supply House.

RIGID

★ Work-Saver Pipe Tools ★

THE RIDGE TOOL CO. • ELYRIA, OHIO

MEETING LOAD LIMITATIONS WITH HIGH CAPACITY

LOW COST Concrete Delivery with Hi-Lo TRUCK MIXERS

3 CUBIC YARD MIXER
4½ CUBIC YARD AGITATOR

2½ CUBIC YARD MIXER
3½ CUBIC YARD AGITATOR

Here's is rugged construction light weight and speed for...

LARGE or MEDIUM SIZE Ready Mixed CONCRETE PRODUCERS

HI-LO

Obtainable with separate Engine Drive or with *POWER TAKE-OFF DRIVE from truck transmission to the Mixer.

*Reduces original investment, weight and operating cost.

"Visible Mixing Action"

CONCRETE TRANSPORT MIXER CO. Phone Flanders 7800

4984 Fyler Ave. • ST. LOUIS 9, MO.

It's HI-LO for Uniform Consistency from Batch to Batch

Use the Request Cards Between Pages 16 & 17 To Obtain Further Information or Printed Matter on Any Product Advertised or Described Editorially in This Issue

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The Kalamazoo Model 2500 Speed Truck can now be fitted with this ½-yard Roura self-dumping hopper.

Self-Dumping Hopper For Material Handler

A new application for the Model 2500 Speed Truck has been announced by Kalamazoo Mfg. Co., 1827 Reed St., Kalamazoo 24F, Mich. The material handling truck can now be furnished with a ½-yard Roura self-dumping hopper which handles cinders, sand, gravel, cement, concrete, water, and most liquid or dry materials. The operator can discharge the hopper without leaving the driver's seat.

A Wisconsin 13-hp engine powers the buggy. The clutch is an automatic dry-plate type, and the transmission offers three speeds. The final drive acts on both rear wheels.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 876.

Slide-Rule Calculator

A slide-rule type of calculator available from Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis., is designed to compute comparative steam costs per 1,000 pounds, using coal, oil, or gas, based on fuel costs of price per ton, gallon, and cubic foot.

On the reverse side of the calculator is an easy-to-use slide indicating the horsepower of Cleaver-Brooks boilers, pounds of steam per hour, output in Btu, equivalent direct-radiation steam in square feet (gross and net), and oil and gas consumption per hour. Various thermodynamic terms are defined, along with grades of oil and Btu gas.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 946.

How to Make a Welder From Your DC Generator

A recent bulletin from Groban Supply Co., 1139 S. Wabash Ave., Chicago 5, Ill,, tells how dc generators may be set up as welders. Their circuit design, the company says, will give satisfactory welding performance under many conditions that may commonly occur. Because of the great differences in types of steels and welding rod in use, Groban suggests that the operator experiment with the settings of the rheostat to obtain the desired results. The company offers the necessary inexpensive items for the conversion. It also has a number of generators for this purpose for those who are starting from scratch.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 861.

New Bulletin Covers Crushing and Screening

A 12-page bulletin covers the complete line of portable and semiportable crushing and screening units made by Smith Engineering Works, 532 Capital, Milwaukee 12, Wis. Detailed descriptions, photos, and tables of specifications outline the features and applications of these units available in jaw and gyratory crusher types.

The Telsmith jaw crusher, gyratory breaker, gyrasphere crusher, intercone crusher, and double-roll crusher can all be furnished as mounted outfits on steel or rubber-tired wheels—with gasoline, diesel, or electric power units.

This literature may be obtained from the company by requesting Bulletin No. 265E, or by using the Request Card at page 16. Circle No. 855.

THERE'S AN AMAZING SAVING IN MATERIALS AND LABOR...AND A

Sensational Improvement in your concrete work

WHEN YOU USE THE

WORLD'S FOREMOST "SHAKE-DOWN ARTIST"

Vibration now is recognized as the most efficient and most economical method of placing concrete. It permits use of a materials-saving harsher mix. It results in a most homogeneous distribution, potently bonded to reinforcing steel and at joints. And it reduces labor costs up to 60%.

But—there is a very real difference in the effectiveness of various types of vibrating equipment.

For general use, the one-man **Vibro-Plus** Internal Vibrator is especially practical. Electrically, gas-engine or pneumatic driven, its simple design and super-flexible shaft allow the operator to get in anywhere—around corners, over forms, into tight and confined areas.

Exclusive patented features assure trouble-free operation over long years of service. For example, the **Vibro-Plus** vibratorhead is unique: it never needs lubrication, yet cannot seize-up. Without interruption, this **Vibro-Plus** Vibrator will continue to produce better concrete construction at lowest cost wherever it is used. Write for complete details and name of nearest distributor.

VIBRO-PLUS Internal Vibrator—one of the complete line made by the pioneer in vibrating and compacting.

The Vibro-Plus Roll-gear Vibrator is available in models delivering from 11,000 to 15,000 vpm. Type MRSB is gas-engine driven. ERSB is electrically operated. Shafts and vibrator tubes are interchangeable.

VIBRO-PLUS PRODUCTS, INC.

54-11 QUEENS BOULEVARD
WOODSIDE, L. I., NEW YORK

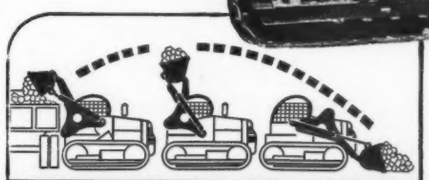
COMPARE... LODOVER WITH ANY FRONT END TRACTOR SHOVEL

... You'll find two important differences! Because LODOVER overhead loading eliminates 2 full turns in every loading cycle, you get—

1. An average of approximately 50% more yardage moved per working day.
2. Lower maintenance cost due to less wear on crawlers, clutches, transmission and 9 other points.

That's why LODOVER operation means extra profits for you on every job!

Write for booklet *"How to Increase Tractor-Shovel Production, Decrease Tractor-Shovel Maintenance."*



ELIMINATES 1200 TURNS (In a normal 8 hour shift)

1 yard Combination Overhead and Front End Shovel for INTERNATIONAL CRAWLER TRACTORS

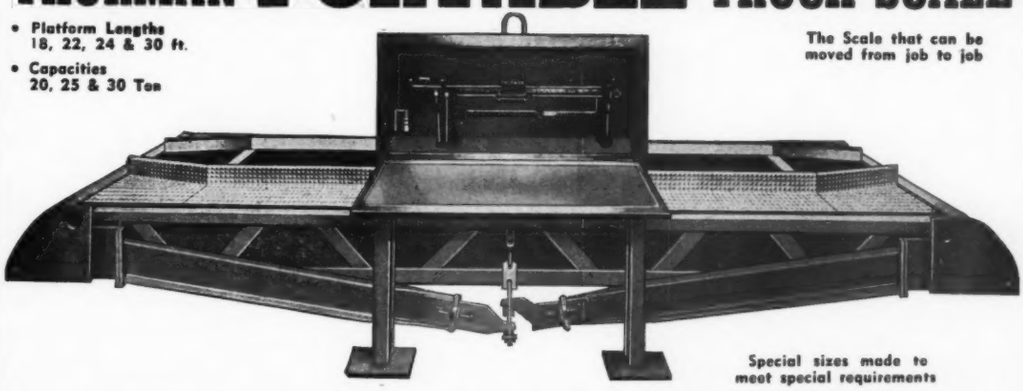
MANUFACTURING DIVISION
SERVICE SUPPLY CORPORATION
2010 ERIE AVENUE, PHILADELPHIA, PENNSYLVANIA

LODOVER Sold by Your INTERNATIONAL HARVESTER INDUSTRIAL POWER DISTRIBUTOR

THURMAN PORTABLE TRUCK SCALE

- Platform Lengths 18, 22, 24 & 30 ft.
- Capacities 20, 25 & 30 Ton

The Scale that can be moved from job to job



Special sizes made to meet special requirements

Wide Steel Bases—support scale—require no concrete footings. Easy-to-read chrome plated weighbeam with vital parts electroplated against corrosion.

Accurate and Portable—This scale can be transported from job to job by removing 6 nuts which hold side arms in place. The rest of the scale can be lifted as a unit. Once located, it can be readied for use in minutes.

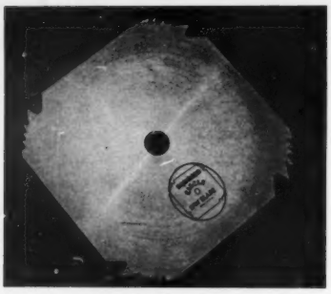
THE COMPLETE THURMAN LINE INCLUDES:

- Pit Scales up to 50 ton capacity
- Pitless Scales
- Batching Scales
- Liquid Weighing Scales
- Wheelbarrow Scales
- Warehouse Scales

This and other weighing equipment in sizes to fit your requirements.

THE THURMAN MACHINE CO.—Scale Division

154 North Fifth Street — Established 1918 — Columbus 15, Ohio



Absence of teeth along the sides of the Squared-Circle saw blade means less friction and cooler operation, the manufacturer says.

Square Saw Blades

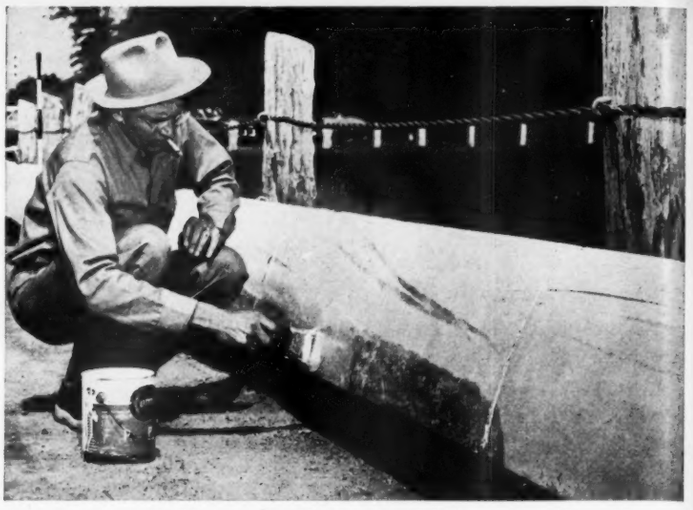
Square saw blades have been introduced by Clark & Sawyer, Inc., 602 Mateo St., Los Angeles 21, Calif. The Squared-Circle blade is said to be fast in handling all types of cross-cutting and ripsawing. It is a square with a series of scientifically designed teeth at each corner. The absence of teeth along the sides of the square means that there is very little friction during the cutting operation, the company says. This results in a cool cutting blade and lessens the problem of burned-out blades or motors.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 879.

Fire-Resistant Buildings

The fire resistance of precast-concrete slabs is highlighted in a bulletin prepared by The Flexicore Co., Inc., P. O. Box 825, Dayton 1, Ohio. Photographs taken during and after a fire at one of the company's plants dramatically show the resistance of Flexicore slabs to intense heat. The charred wood and bent steel are contrasted with the Flexicore walls, roof, and floors, which were not damaged.

This literature may be obtained from the company, or by using the Request Card at page 16. Circle No. 909.



The only damage to this concrete guide after impact tests was a small scraped area—here it gets a touching up with Corrosite protective plastic paint.

Protection Paint Used on Guardrails

A protective plastic paint, Corrosite, was used on recent highway guide-rail tests in Connecticut, and successfully withstood the various impact tests to which it was subjected.

The manufacturer of Corrosite points out that the paint forms a tightly bonded impervious membrane over a concrete surface, which prevents chipping even under extreme conditions such as those of the test. Corrosite is elastic so that it withstands expansion and contraction, the company says. It is not affected by alkalis, salts, chlorides, or weather. It seals and protects a concrete surface.

Further information may be secured from the Corrosite Corp., Chrysler Bldg., New York 17, N. Y. Or use the Request Card at page 16. Circle No. 943.

Use of Calcium Chloride With Air-Entrained Concrete

An informative service brief on the use of calcium chloride with air-entrained concrete has been prepared by the Calcium Chloride Association, Ring Bldg., Washington 6, D. C. It points out that integral calcium chloride used with air-entrained concrete will produce the same gain in both early and ultimate strengths as it will with normal portland cement. The same resistance to freezing and thawing normally produced by air-entrained concrete is maintained, the Association says. The brief goes on to discuss the effects of air entrainment, the durability of the concrete, and how to use the calcium chloride.

This literature may be obtained from the Association by requesting Brief CB-5, or by using the Request Card at page 16. Circle No. 898.

"I found out early...

"I had not been in business very long before I learned what the choice of a top-flight surety company can mean to a contractor.

"I was bidding on an out-of-state job – the biggest job my company had gone after up to then. Yet as soon as I talked to the Ætna Casualty and Surety Company's men, I knew I had come to the right place. Their underwriters understand a contractor's problems right down to the ground – no matter how complex a job may be. And, when we placed that first out-of-state bid, I found out that Ætna's nationally known and respected name in back of us meant a lot in getting favorable recognition.

"Since then, my associates and I have bonded many hundreds of contracts with Ætna – and have always been glad we established that company as our surety early in the game. In emergencies – when a filing deadline is close – Ætna's coast-to-coast facilities and prompt service can make a big difference. And always – Ætna's thorough understanding of the business and the unquestioned respect that the name carries are important assets for the contractors they bond."

Coast to coast . . . you can count on The Ætna Casualty and Surety Company for prompt, efficient contract bond service.

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The Ætna Life Affiliated Companies write practically every form of insurance and bonding protection

LIFE AND CASUALTY
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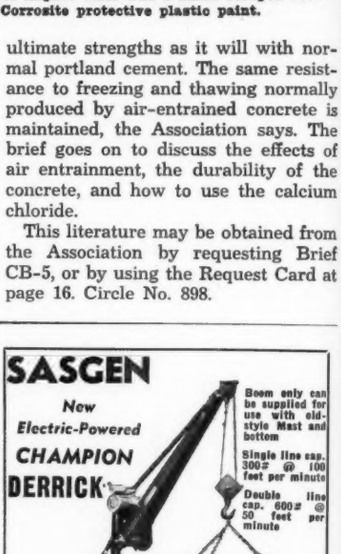
Boom only can be supplied for use with old-style Mast and bottom
Single line cap. 300# @ 100 feet per minute
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The most complete line of contractors' derricks, hoists, and winches. Write for catalog.

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Hard-Surfacing WELDING ELECTRODES

- SEACO resists severe abrasion and impact.
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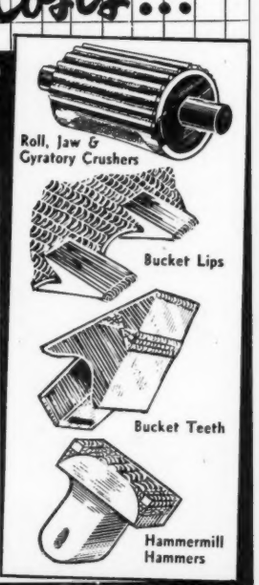
- SEACO is available for immediate delivery from your distributor's stock, in ¼" and 3/16" diameters, standard lengths, 12".

ORDER SEACO TODAY!

Write TODAY for FREE Literature on SEACO and MANGANAL, Giving the Newest Methods of Economical Repairs.

Name of Nearest Distributor Upon Request



STULZ-SICKLES CO.

SOLE PRODUCERS
91 N. J. Railroad Ave.
Newark 5, New Jersey

How You Can Lower Your 1951 Income Tax

(Continued from page 3)

$5,000). That's why it is wise to throw in many expenses as business costs. To see how this works in the case of charity contributions, consider Brown and Green.

Brown gave $100 to a Boy Scouts drive, $50 to the Red Cross, and $50 to the Community Chest. (It is perfectly legitimate for any business to donate to charity drives—moreover, it is good public relations.) Brown, a single proprietor, wrote checks to the Scouts, Red Cross, and Community Chest on his company's bank account. That meant he had $200 of deductible charity donations to take off as a business expense. Since his personal deductible items were few, he used the blanket deduction instead of itemizing —got his 10 per cent on his personal tax *plus* the extra $200 tax credit on his business account.

Green, on the other hand, was less tax-wise although every bit as much a good citizen. He, too, gave $200 during the year to various civic and charity drives. But he paid them out of his pocket as Green the private citizen, instead of having them come from the Green Construction Co. As a result, he lost all tax credit for the deductions, since his other personal deductions were not large enough to make it profitable for him to use the "long form" and itemize.

Things as well as money count for deductible charity contributions. Bill Black, knowing this, obtained a tax saving of almost $100 by donating old office furnishings to a charitable institution. "If we had sold these, we would have realized practically zero," he says. "By giving them away, we were able to claim a contribution for tax purposes."

It is important to remember in a case like Bill Black's that Uncle Sam will allow the claim provided you put down a fair valuation. A fair valuation means an approximation of the true depreciated value, not what the donated things cost when they were new many years ago.

Working the Kids

Some contractors permit their children to work after school and during vacations. It's well to watch a setup like this lest it cost the father a $600 credit. When a minor dependent earns $500 or over during a year, he can no longer be claimed as a dependent. The trick is to be careful that a dependent son or daughter doesn't make over $500. By keeping his or her income under that figure, you can keep the wage cake and have the tax saving too.

Jim Cooper's 16-year-old son does vacation work as an office boy and all-around errand runner. Since his pay came to less than $500 last year, Cooper was able to claim the boy as a dependent *and still take a business deduction for the boy's salary.*

Fred Martin, on the other hand, lost his son as a dependent when he didn't watch the boy's earnings. Like any father, he was proud when Fred, Jr., asked permission to have a newspaper route after school hours. Junior's earnings came to $586.72, and Fred Senior had to pay almost $200 in extra taxes when he could no longer put down his son as a dependent.

Capital Gains and Losses

The distinction between long-term and short-term capital gains is useful in setting up tax savings. A short-term gain or loss occurs on the sale of an asset held less than six months. If the item has been owned for a half year or better, the gain or loss is a long-term one.

On long-term gains, only half of the gain is taxable, and that at a rate of no more than 50 per cent. In other words, the highest tax on a capital gain of the long-term variety is 25 per cent.

As with long-term capital gains, long-term capital losses are deductible only up to 50 per cent. But short-term capital losses may be deducted 100 per cent. (A short gain is taxed 100 per cent.) A short-term loss can be used to offset a long-term gain of twice the amount. If there is a large short-term loss—more than can be used to wipe off long and short-term gains—then the loss can be deducted directly from regular income up to the extent of $1,000. Any loss remaining above the $1,000 figure may be carried over for use in five subsequent years.

Well aware of the workings of the capital-gains provision of the tax law, George Gray halved his tax on a long-term gain of nearly $2,000 realized from a stock sale. Gray owned a pickup truck that drank oil as if the stuff tasted good. It burned gas. It was one of those postwar lemons bought at an inflated price. Gray's books showed a depreciated valuation of $1,000 on the truck. He took it to a dealer who examined the vehicle and said shortly: "Fifty dollars."

"Done," said Gray, who was well aware that he couldn't have traded the creaking vehicle for more than that amount anyway. He then went back to his desk and happily deducted a long-term paper loss of $950 from his very real dollar stock gain of $2,000 and

(Concluded on next page)

Thank you Mr. Merrill, for those nice words about the **MERCURY AUTOMATIC CLUTCHES** *used on* **Woodsman Chain Saws.**

Woodsman Power Saw Co. of Eureka, Calif. have been using *Mercury Automatic Clutches* for the past three years. Listen to what their manager, Cliff Merrill, has to say. "We do not know how or where we could possibly find a clutch so well suited for our application as the Mercury Clutch....The fine balance, close tolerance, cool operation, long life, and its ability to stay adjusted and on the job over long periods of time amaze us."

For all equipment using gasoline engines or electric motors investigate the *Mercury Automatic Clutch.* May also be installed on jobs in the field. Write for Mercury Catalog CM-3.

MERCURY CLUTCH DIVISION
AUTOMATIC STEEL PRODUCTS INC. · CANTON 6 · OHIO

OWENS take in "A LOT OF TERRITORY"...

"A Mouthful at Every Bite," with more bites per day takes in a "lot of territory," whether you're operating in sand, gravel, mud or coal with an Owen Bucket on your boom.

Owens are on the job in lots of territories all over the world. Insuring a bigger day's work, *every day* and satisfying more operators and contractors *every day*.

Rapid loading of hopper cars is easily accomplished with this Owen Bucket.

OWEN ROCK GRAPPLES of improved, latest design are available in various types with full blade, semi-blade, or rock tine independently acting tines.
Write for the catalog.

"A mouthful at every bite"

THE OWEN BUCKET CO.
6030 Breakwater Avenue • Cleveland 2, Ohio
Branches: New York, Philadelphia, Chicago, Berkeley, Calif.

ONLY WHITE VIBRATORS HAVE ALL THESE FEATURES

which have made them successful all over the world.

All Flexible Drive Sections are Interchangeable.
No special sections, or expensive extra couplings needed. Each casing has ball bearing connector.

No Limit to Length of Flexible Drive.
Each driving core has slip joint which does not separate in service. Prevents stretching.

All Vibrator Heads are Interchangeable.
Can be put directly on any drive section. Can be opened for repairs. Double row ball bearings.

Grinding Spindles can be attached to any section.
No special drive needed. For wet and dry grinding.

Standard Power Units.
Gasoline engines or electric motors which can be serviced almost anywhere. Swivel base. Barrows.

Minimum of Repair Parts Needed.
One spare driving core is ample. Either 7' or 12'.

Write for circular and name of nearest dealer.

Elkhart White Mfg. Co. Indiana

How You Can Lower Your 1951 Income Tax

(Continued from preceding page)

thereby reduced his March 15 liability by $237.50.

Spending Insurance Payments

When a contractor receives insurance payment for a loss, how he spends the payment means a difference in the amount of money which the Collector of Internal Revenue asks. To illustrate this, there is the case of Harry White. White's warehouse building burned to the ground. Its depreciated value had been $19,000. Harry had wisely insured it for 1951 replacement cost—some $26,000. Question: Was his "profit" of $7,000 taxable?

That depended, he was told, upon how the $7,000 was spent. If it went to buy a new building of approximately the same size and the same real value as that which had been destroyed, then there was no tax liability. But if Harry pocketed the $7,000, or spent it for any purpose other than to replace his lost unit with a nearly identical building, then Uncle Sam would expect to be paid a tax share of the "profit".

Automobiles

A personal automobile can count as a business deduction under certain circumstances. Merely riding it from home to work and back every day does not make it a business vehicle. But if a contractor—or any of his employees—uses it for doing any tasks, however small, connected with the business, then the car's expenses become partly deductible.

It's easy to figure just how much may be deducted. Say that a personal-pleasure car is driven 10,000 miles during the year. About 1,000 of those miles were on working chores. That's 10 per cent of the use. Then 10 per cent of the yearly depreciation may be charged off as a business expense, along with a tenth of the total amount paid for gasoline, oil, lubrication, maintenance, and repairs to the car.

And Another Thing

Here are some miscellaneous hints on how to reduce the bill owed Uncle Sam on the Ides of March:

1. *Don't be afraid of the long form.* A Louisiana contractor was astounded to learn from casual conversation with a friend that all interest payments are deductible—including personal loans, mortgages on a home, notes at the bank, time payments on a kitchen appliance. His mortgage interest alone last year amounted to over $800. With that as a broad base, plus medical deductions, deductible taxes on personal purchases, and other small amounts, he could legitimately claim more than double that $650 blanket amount he would have been permitted on his net income of $6,500.

2. *Take full advantage of split-income provisions.* Since passage of the tax law in 1948, these are now available to citizens of all states. Formerly only a lucky minority in states with community property laws could "split". Splitting income enables you to move both halves into a lower bracket.

3. *Be sure to take all special exemptions.* If you are 65 or over, you're entitled to an extra $600 personal exemption. So is your wife (but not other aged dependents). If your vision is less than 20/200 in your best eye, you're entitled to an added $600 personal exemption.

4. *Count all medical expenses* if itemizing on the "long" Form 1040. In addition to doctor bills and hospital expenses, figure in hospitalization and surgical insurance premiums, drugs (routine medicines such as aspirin count), nurses' fees and board, travel to obtain medical care, eyeglasses, dental care, false teeth—anything connected with keeping up your health.

New Screen Mounting

A new type of rubber molding for vibrating screens snaps onto cross members supporting the screen cloth. It is made by Deister Machine Co., 1933 E. Wayne St., Fort Wayne 4, Ind.

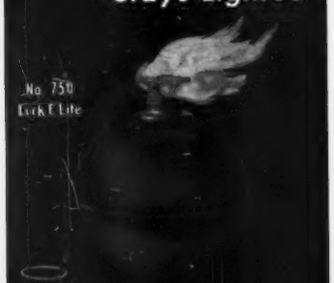
Now standard on all Deister screens, the mounting is said to prevent line contact where the screen normally whips against support tubes. It presents a wide, flat, rubber surface to the cloth to reduce abrasion and to spread the point of contact, to reduce friction and the possibility of later breakage. It also may be applied to Deister vibrating screens now in the field.

This rubber mounting is now standard on all Deister vibrating screens. The pencil points to the flat surface presented to the edge of the screen to reduce abrasion and friction.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 866.

EMBURY

The Torch that Stays Lighted



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The EXTRA trailer for EXTRA production

MILLER *Tilt-Top*

CUTS job-to-job time for slow machines!

MODEL "B" 10 TON $1175.

The following equipment is optional and extra: hydraulic tilt control, two speed winch, electric brakes.

Where large flat bed trailers are usually too cumbersome for lighter hauling . . . a MILLER Tilt-Top is always handy for moving slow machines from one operation to another. Self-moving equipment practically loads itself onto tilted platform and can be towed to the next operation in jig time . . . cutting non-productive time for operator and equipment to a minimum. Standard platform is 14' x 8' optional 16' available.

MILLER Tilt-Top TRAILER research engineers

IMMEDIATE DELIVERY
SEE YOUR DEALER or WRITE
Dept. C-11 729 W. BURNHAM ST.
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BIN-FLO USES SMALL VOLUME OF AIR AT LOW PRESSURE

KEEPS BULK MATERIALS MOVING

BIN-FLO units in bins, chutes, hoppers, etc., restore flow characteristics to dry, finely ground materials which tend to pack or bridge in storage. Types for all materials and conditions. No moving parts; simple installation; negligible operating cost; no maintenance cost.

BIN-DICATOR bin level indicator—"The Eyes of the Bin"—automatically reports levels of materials in storage; automatically controls filling machines; prevents waste.

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Clutch Engineering Help for Transmission Designers

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ROCKFORD CLUTCHES

Avoid Legal Pitfalls

Edited by A. L. H. STREET, Attorney-at-Law

These brief extracts of court decisions may aid you. Local ordinances or state laws may alter conditions in your community. If in doubt consult your own attorney.

Liability for Defects After Work Is Accepted

THE PROBLEM: *A subcontractor left a structure defectively completed, but not so as to create an inherent or, to him, obvious danger of collapse. Could he be held liable when the general contractor and another subcontractor superimposed other construction over the defect and injury resulted?*

THE ANSWER: No. (Galbraith v. Illinois Steel Co., 133 Fed. 485, decided October 13, 1904, by the United States Circuit Court of Appeals, Seventh Circuit.)

Despite its age, this decision seems to remain the leading one on this particular point—partly because the United States Supreme Court intimated its approval of the decision by refusing to entertain an appeal from it.

Plaintiff owned a building in which a sprinkler company agreed to install a sprinkler system and steel framework atop the building to support a large water tank. The company sublet the latter work to defendant. In preparing shop plans, defendant's engineers omitted a tie member of the triangular top of the framework, and that member was omitted in the construction. Defendant knew that a tank was to be placed on the framework. That was done after defendant's work was accepted. Due to the weight of the tank filled with water, and to a heavy wind, the structure collapsed, entailing considerable damage.

The court fully recognized that if the sprinkler company, which sublet the framework to defendant, had sustained damage as a result of defendant's breach of contract to install the omitted tie member, it would have had a valid claim against defendant. But there was no such contractual relationship between the plaintiff building owner and the defendant.

The court thought that the more culpable cause of the accident was the act of the contractor who erected the tank. He placed it on a triangle, one side of which was plainly missing, knowing better than did defendant what weight would be placed upon the framework.

In another case which the United States Supreme Court refused to review (Salliotte v. King Bridge Co., 122 Fed. 378), the United States Circuit Court of Appeals, Sixth Circuit, decided that a general bridge contractor was not liable to a riparian landowner for injury to his land caused by any negligence of a subcontractor in dredging for the construction of piers. No injury had occurred until after the bridge was completed and accepted. The court said that there was no rule of law "under which a third person may recover damages against a . . . contractor for an injury sustained by . . . defective construction, if the thing constructed is not inherently and necessarily dangerous, when the injury did not occur until after the . . . contractor had parted with possession and title. . . . A stranger can hold him liable after he has parted with possession only under exceptional circumstances."

Another Federal court decision shows that even though public safety may require that warnings be maintained on work, a contractor is under no implied obligation to leave them after his work is finished and accepted. After a breakwater at a lake harbor entrance had been completed and accepted, a vessel collided with one end of the unlighted breakwater and sank. The United States Circuit Court of Appeals, Sixth Circuit, decided that the contractor was not liable for a drowning which resulted. (Williams v. Edward Gillen Dock, Dredge & Construction Co., 258 Fed. 591.)

The court recognized the obligation of the contractor to maintain a suitable warning light while building an obstruction to navigation, but declared that the duty shifted to the owner when the work was accepted.

The same principle was applied by the Minnesota Supreme Court in a later (1926) case. There a highway grading contractor was exonerated from liability to a traveler who drove over the edge of an unguarded embankment after the work had been accepted. (Rengstorf v. Winston Bros. Co., 208 N. W. 995.) The court stressed the fact that it was for the State, not the contractor, to say when travel should be permitted. It held that contract provisions which required the contractor to maintain barricades while the work was being done could not be interpreted as requiring him to place permanent guardrails, which, in fact, should be placed by the State.

But it is equally well established by authoritative court decisions that, despite acceptance of a contractor's work, he may be held liable for damages resulting from leaving a structure in inherently dangerous condition—particularly where the condition results from culpable neglect to perform according to contract specifications. Numerous cases have involved the collapse of bridges due to badly constructed piers, and damages have been awarded for resulting injury to persons and property.

In the case of Pennsylvania Steel Co. v. Elmore & Hamilton Contracting Co., 175 Fed. 176, plaintiff had a subcontract to erect a bridge superstructure upon piers constructed by defendant under another subcontract. Plaintiff, not knowing or having reason to know that the piers had been defectively constructed, placed valuable tools, machinery, and materials upon the piers preparatory to erecting the superstructure. These were lost or damaged through collapse of the piers, allegedly badly constructed. The United States Circuit Court for Northern New York decided that a complaint alleging these facts stated a right to recover damages. The court said that liability was based not upon a theory of breach of contract, but upon the defendant's liability for leaving the piers in a condition known to be unsafe, and knowing that plaintiff would place materials, etc., upon them.

Rights of Aggrieved Third Parties Under Job Contract

THE PROBLEM: *A Federal flood-control-project construction contract provided: "The Contractor shall protect all existing structures, utilities, and work of any kind against damage or interruption of service," which damage or interruption "shall be repaired or restored promptly by or at the expense of the Contractor." Did this clause permit a third party to sue the contractor directly for damages resulting from breach of the clause?*

THE ANSWER: Yes. (Wolcott v. Johnson, Drake & Piper, 100 N. Y. Supp. 2d 990, decided by the New York Supreme Court, Chemung County.)

The court rejected argument on behalf of the contractor that the clause was intended solely to protect the Government against suits by third parties.

Truck Injures Job-Seeker

THE PROBLEM: *A 17-year-old was seeking a job as water boy on a highway construction project. As he was walking along a path to find the boss, he was injured by a truck that backed into him from the rear. Was the contractor liable even though the road along which the youth proceeded had been closed to traffic?*

THE ANSWER: Yes. (Bennett v.

(Continued on next page, col. 3)

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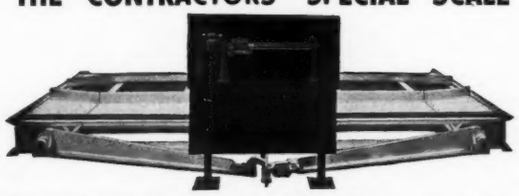

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Avoid Legal Pitfalls

(*Continued from preceding page*)

Boney, 80 Atl. 2d 81, decided by the Pennsylvania Supreme Court.)

The court said that the boy was not a trespasser and was not necessarily guilty of contributory negligence in passing the barricade in search of employment. He was entitled to protection against active negligence on the part of the driver of the truck.

The same day the court reached a similar conclusion in another case involving a similar accident, where a job seeker was struck by a backing truck near a concrete mixer. (Potter Title & Trust Co. v. Young, 80 Atl. 2d 76.) In that case the court said that had the injury resulted from unsafe condition of the highway, there would have been no liability on the contractor's part. But backing a truck any place without caution is active negligence.

Tax on Gasoline Refunded

THE PROBLEM: *Huge overwidth and overweight trucks specially made for use on dam construction moved partly over a highway, under special and restricted permission from a state highway department. A statutory provision exempted from tax vehicles not "capable of being operated upon a public highway". Under this provision, was the truck owner entitled to a refund of state gasoline taxes paid for fuel used in operating the trucks?*

THE ANSWER: Yes. (Mason-Walsh-Atkinson-Kier Co. v. Case, 97 Pac. 2d 165, decided by the Washington Supreme Court, 1939.)

The court emphasized the fact that, although the trucks moved under their own power over a highway, a special permit was required and the trucks had to be empty. The court thought that the Legislature intended to tax only "normal functional operation" of vehicles.

No Pay if License Expired

THE PROBLEM: *An Arizona statute—probably patterned after laws in other states—provides that a contractor cannot sue for pay unless he was licensed when his right to sue arose. A building contractor's license was in force when he took a contract; he did some work before the license expired; but he did not renew it. No money was due him before the license expired. The state registrar of contractors told the contractor it was all right to go ahead and finish the work. Could the contractor force the owner to pay his agreed compensation on a cost-plus basis?*

THE ANSWER: No. (Nothen v. Elledge, 232 Pac. 2d 111, decided by the Arizona Supreme Court.)

The court said that the consent given by the state registrar did not excuse violation of the licensing law, no power being given that officer to excuse anyone from complying with the statute.

Not even the court had power to override the law on a theory that it would be unreasonable for the owner to accept the contractor's work and then refuse to pay for it. The statute was

(*Concluded on next page*)

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Avoid Legal Pitfalls

(Continued from preceding page)

designed to protect the public "against unscrupulous and unqualified persons purporting to have the capacity, knowledge, and qualifications of a contractor." That an unlicensed contractor loses the right to collect for his work is a consequence of his own failure to secure or renew a license. (Perhaps the court was reminded of the story about a youth, who, on being asked by a judge if he had any excuse to offer why he should not be sentenced for murdering his parents, replied: "I ask the mercy usually shown orphans.")

Fill Washes Out, Crane Sinks; Then Boom Damages Building

THE PROBLEM: *A sewer trench was refilled with sand and bank gravel which, according to evidence, was properly tamped. Friday night, when a week's work ended, a 42-ton crawler-mounted crane was left on top to fill, supported by two timber mats each 48 square feet. The weather forecast called for occasional slight showers, but a record-breaking cloudburst developed. The fill was so washed out as to cause the crane to sink and the boom to damage an adjacent building. In a damage suit by the building owner against the city, which owned the crane, did the trial judge improperly award judgment against the city?*

THE ANSWER: Yes. (Warych v. City of Schenectady, 103 N. Y. Supp. 2d 320, decided by the Appellate Division of the New York Supreme Court, Third Department.)

Ordering a new trial, the Appellate Division decided that the evidence produced at the trial showed that an ordinary rain, such as was reasonably to be expected, would not have caused the crane to sink, and failed to show that there was fault in the way the fill had been tamped.

Carelessly Backed Truck

THE PROBLEM: *A ready-mixed-concrete company supplied mix to a paving subcontractor on a real-estate development project. The trucks moved upon parallel rows of mats 30 inches wide. In backing without being signaled to do so, a driver's attention was riveted on the truck wheels and the mats. He backed into and injured a concrete inspector employed by a testing laboratory. Was the ready-mixed-concrete company liable in damages?*

THE ANSWER: Yes. (De Roode v. Jahncke Service, Inc., 52 So. 2d 736, decided by the Louisiana Court of Appeal, New Orleans.)

The court said that the inspector was not chargeable with having caused his own injury by standing in the path of the backing truck, because he was at the moment inspecting concrete and did not know that the truck was approaching.

As to the truck driver, the court said if he undertook to back the truck unaided, while gluing his eyes on the rear left wheel, "it was the grossest negligence to do so without making certain that there was no one in the rear who might be hurt."

The court said that, under the circumstances, the paving subcontractor was not liable for the accident, even though his employees had on previous occasions signaled the ready-mixed-concrete company's trucks when to back. On this point, the court observed that if the driver did not blow his horn for assistance, he should have waited until someone could come and assist him. The real cause of the accident was not the passive failure of the paving subcontractor to furnish assistance but the active negligence of the driver in proceeding without it.

The court left undecided the question whether, under other circumstances, the paving subcontractor would have been liable for his employees' failure to assist in backing the truck, pursuant to a custom voluntarily created by those employees without authority from the paving company.

Injury to Pedestrian—Subcontractor Liable

THE PROBLEM: *A street-improvement contractor sublet to defendant work that included construction of manholes. Because of rain, work was suspended in December and the subcontractor placed over the holes covers made from heavy lumber such as contractors commonly use. March 3, before resumption of work, plaintiff, a pedestrian, stepped into one of the holes from which the cover had been removed by some unknown person. Could the subcontractor be held liable to plaintiff, regardless of liability as between him and the prime contractor, on the ground that the subcontractor owed a duty to the public to inspect the holes to be sure that the covers were in place?*

THE ANSWER: Yes. (Williams v. Wise, 51 So. 2d. 1, decided by the Alabama Supreme Court.)

The court decided that a prime contractor and his subcontractor are each liable for injury to a member of the public resulting from negligent failure to keep the job in safe condition. It held that the subcontractor was liable to plaintiff regardless of whether, as between the contractor and the subcontractor, the duty rested upon one or the other.

What Are Watertight Sewers?

THE PROBLEM: *Where a contractor agreed to construct a "watertight sewer", was he bound to construct one that was literally watertight?*

THE ANSWER: No. (Jose Naples, Inc., v. Great Notch Development Co., 149 Atl. 33, decided by the New Jersey Supreme Court, 1930.)

The court's decision was influenced by testimony of sewer experts that a sewer could be regarded as watertight even if 3 inches of water had collected in the pipes. The test was whether or not there was enough water to interfere with proper working of the sewer.

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Hendry dredge No. 3, a 22-inch hydraulic dredge, did the widening and deepening in Shipyard River at Charleston, S. C.

Here are her captain and chief engineer, V. H. Thomas and J. A. Powers, with Hendry Superintendent I. W. Haile (left to right).

Harbor Improved at Charleston

By WILLIAM H. QUIRK,
Eastern Editor

Shipyard River Is Widened and Deepened by Dredge Using 8,300-Foot Discharge Line Including a Submerged Section

• DEEP water, assuring added berthing facilities and a channel for shipping, has recently been provided in the lower part of Shipyard River at Charleston, S. C. This improvement to the busy harbor was made by the Hendry Corp. of Rattlesnake, Fla., under contract to the Corps of Engineers, Department of the Army, and directed by the District Engineer, Charleston District. Involving over 2,000,000 cubic yards of dredging, the project included the widening of Shipyard River at its confluence with Cooper River, and the extension of a channel, 200 feet wide x 30 feet deep, upstream from the existing channel. The work was completed last May.

Shipyard River enters the west bank of Cooper River north of the Charleston city line, and at the lower end of the U. S. Navy Yard. Some years ago lumber companies were located along the shores of the river, and logs were rafted up and down its waters. Industries that need waterways for their commerce have now located on Shipyard River, as the lumber companies have faded from the scene. Gulf Oil Co. has a terminal at the lower end of the river, adjoining the docks of the Etiwan Fertilizer Co. Farther upstream are the wharves of the Pittsburgh Metallurgical Co. plant.

Part of the contract was considered as maintenance dredging, and part as new work. The maintenance portion totaled about 540,000 yards, and extended from the channel in Cooper River approximately 3,000 feet to the upstream end of the turning basin at the Gulf Oil Co. terminal. River silt that had been deposited in the channel was removed, restoring the 30-foot depth below mean low water; a 2-foot overdepth was permitted on the maintenance work as the cut was fairly shallow, averaging about 5 feet.

On the new work, involving approximately 2,000,000 yards, the 30-foot depth was also required but the overdepth allowed was only one foot. A

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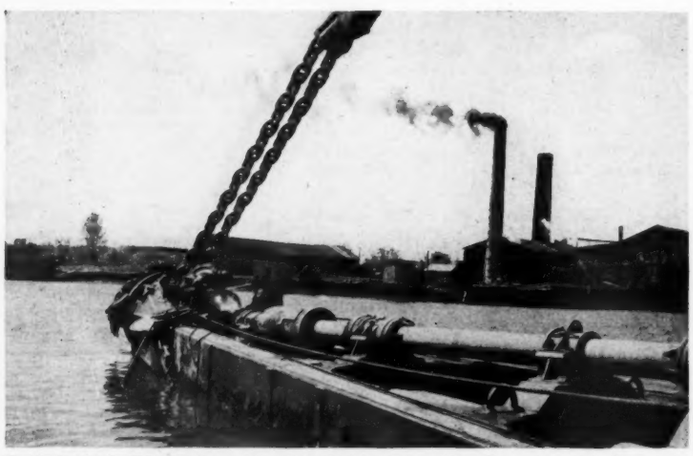
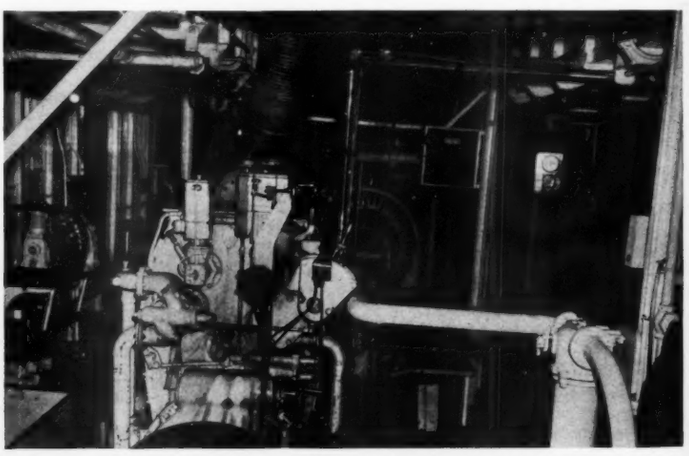


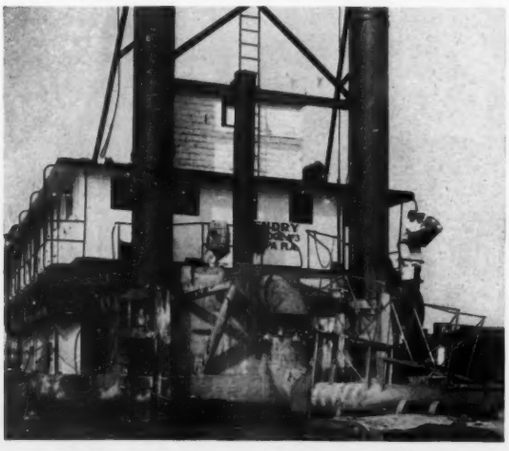
No. 3's ladder is 57½ feet long and weighs 60 tons. The welders at work on it in this photo are welding thrust collars, using Fleetweld rods.



Main engine of the No. 3 is this General Motors 16-cylinder diesel, which delivers 1,440 hp at 720 rpm. The changeover from steam to diesel was made in 1949.

C. & E. M. and Hendry Corp. Photos

The discharge line runs along the port side of the deck house on brackets and leaves the dredge at the center of the stern.



Most of the floating line on this job was in 100-foot lengths made by welding 50-foot lengths together. Each section was floated on three steel pontoons, and a 20-inch catwalk ran over the pipe.

200-foot channel goes upstream from the lower turning basin about 3,300 feet, ending in a new turning basin, 700 x 600 feet, in the vicinity of the Pittsburgh Metallurgical Co. plant.

More Than Just Dredging

Hendry's price on the contract was 17.2 cents a yard, bringing the total around the neighborhood of $375,000. When the contractor began operations in July, 1950, the depth of water in upper Shipyard River had been reduced by silting to a maximum of 8 feet. In many places the stream, which once had a 20-foot depth, had been completely filled in, and the uneven channel, such as it was, contained a number of tortuous curves and bends. In straightening the channel, it was frequently necessary to dredge away a solid bank with a total depth of 35 feet.

The 200-foot width of channel is a bottom measurement, with the sides of the cut taking a 4 to 1 slope. The material removed consisted of silt, mud, and blue clay. Besides the dredging, the contractor also took from the river large quantities of logs that had sunk in the soft bottom during lumbering operations in years past. Most of this snagging was done with a Lima crane having a 70-foot boom and 1½-yard clamshell bucket, and mounted on a barge.

But the biggest obstacle in the channel was the hull of a World War II LCT that had sunk while carrying a load of heavy scrap metal. Its bow was still out of the water, but some of the water-tight compartments had been stove in. To raise this craft, the contractor used an LSM, 110 feet long, equipped with a 40-foot A-frame and an American 2-drum hoist powered by a Ford V-8 gas engine. The LSM also served as a materials barge. With the hoist putting into effect an approximate 50-ton lift, the bow of the sunken hull was raised on a cable. Compartments were pumped dry and patched to aid in flotation, while the attached line was shifted amidships and finally to the stern as the LCT once more was afloat.

Hendry No. 3

Hendry dredge No. 3, a 22-inch hydraulic dredge, handled the river work. The original No. 3 dredge of the Hendry Corp. had a timber hull and deck house, with steam for the operations. Recent improvements have altered practically everything but its

Hendry Corp. Photo

Spoil area for the dredging contract was Daniel Island, north of Cooper River bridge.

No. 3 registry name. Hull and deck house are now sheet steel, and diesel engines are the prime movers. The changeover was completed in May, 1949. Above the 110 x 30 x 8-foot-deep hull is the glistening white deck house trimmed with black. Quarters for a crew of 42 are on the upper deck.

At the bow is a 35-foot steel A-frame supporting a 57-foot 6-inch ladder weighing 60 tons. To compensate for this great weight, a steel pontoon was added to the forward end of the hull at each side for adequate freeboard when the ladder is down. While not required on this work, depths of 50 feet have been dredged with this ladder in cutting a ditch for a cable crossing in the St Johns River near Jacksonville, Fla. In Shipyard River the maximum depth was 31 to 32 feet.

Running down the top of the ladder is an 11⅜-inch shaft at the end of which is the 6-foot-long x 6-foot-diameter cutterhead. Various combinations of short and long teeth are used on the cutterheads, which are generally equipped with 5 or 6 blades. While most of the material pumped was clay, there were also strata of sand and silt, and oyster-shell deposits that required switching of cutterheads to meet the conditions encountered.

Suction and Discharge

From inside the cutterhead, and hung from the bottom of the ladder, is the 25-inch suction line that runs back to the pump. A flexible-rubber sleeve, 17 feet long x 25 inches ID, provides the necessary joint for the suction line to enter the hull, and for free vertical movement of the ladder. Just before entering the pump the 25-inch line enlarges to 28 inches where a clean-out trap is located for removing any trash that may have been sucked into the line. An overhead rail that runs down through the engine room carries a 5-ton chain fall for machinery handling. It is also used to lift the heavy lid from the trap. In this way, logs or boulders are caught before they can damage the pump.

The Hendry-designed and built pump has a 4-vane 72-inch impeller, and an overshoot 22-inch discharge that leaves the pump at the top on the port side. When a synchronous motor was added to the engine room, the position of the pump was changed, resulting in the overhead discharge. The discharge line is supported head-high on brackets along the port side of the deck house. It cuts back to leave the dredge at the center of the stern between the spuds. A Mobile Pulley 27-inch flexible ball-joint connection permits a swivel swing of 220 degrees where the floating line takes off.

Just above the line as it leaves the dredge is an air trap—a vertical cylinder capped at the top, and connected to the discharge at the base. This trap absorbs the ramming action from a heavy surge in the pipe that occurs on

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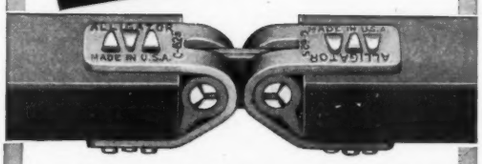

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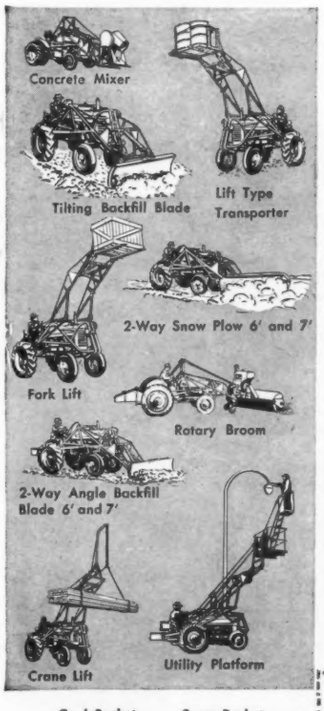

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Harbor Is Improved At Charleston, S. C.

(*Continued from preceding page*)

a long discharge line when the dredge pump is cut off.

A 33-foot gallows frame at the stern supports the two spuds that move vertically in outside wells. They are hollow steel cylinders, 32 inches OD. The digging or port spud is 74 feet 8 inches long with 1½-inch walls, and weighs 20 tons. The walking or starboard spud is 65 feet long with 1-inch walls, and weighs 14 tons.

Off the bow at each side is a steel anchor boom, 67 feet long on the port and 69 feet on the starboard. Breaks and subsequent repairs account for the differences in length. On this job where the shore line was close on one side of the channel, only one anchor boom was used to any extent. The dredge swung on one anchor in the river, which was lifted by the boom, and the other anchor as a deadman on the bank; the latter was handled by a derrick barge.

Diesel-Powered

Now for a look on the inside. Amidships in the engine room, and slightly to starboard of the longitudinal center line of the dredge, is the main engine, a General Motors 16-cylinder diesel, delivering 1,440 hp at 720 rpm. Immediately forward of the engine is a Fawick Airflex clutch connected to a Westinghouse 1.9 to 1 reduction gear. This gear turns the pump shaft which is on the dredge center line. From the reduction gear forward to the pump are a coupling, a thrust, and a Hendry pedestal bearing.

Aft of the main engine, and to port of the center line, is the main generator, a General Electric 750-kva 480-volts 60-cycle 900-amp unit. It is driven by a GM 12-cylinder diesel engine, 900-hp at 740 rpm. Back of the pump, and off to starboard, is a G-E 500-hp synchronous motor which is connected to the pump shaft through a 1 to 1 silent chain, 6-inch x 1½-inch, and the Westinghouse reduction gear. When the diesel engine and the syn motor are both turning at the same speed, their combined mechanical and electrical power is exerted on the pump shaft through the reduction gear. Average speed of the pump is 375 rpm.

While the main generator furnishes all electric power—110-volt circuit for lights and 440-volt for service pumps and auxiliary equipment—there is also a standby generator along the starboard side aft of the main engine. This G-E 150-kw 480-volt 60-cycle 280-amp unit is driven by a Cummins Model L 6-cylinder diesel engine, 190-hp at 720 rpm.

Hendry Corp. Photo

Hendry devised an automatic valve for the pipeline, which opened to let air escape whenever the pump shut down. This kept the submerged part of the line under Cooper River from floating to the surface. The valve closed when dredging resumed.

Dredge Operations

The cutterhead is driven by two Fairbanks-Morse 200-hp electric motors, located at the bow on either side of a reduction gear that converts the 900 rpm of the motors to 22 rpm on the cutterhead. The winding gear, a Mobile Pulley 7-drum hoist, is operated by a Westinghouse 75-hp motor placed on a platform above the drums. The drums are in two rows just inside the forward end of the deck house. In the first row are the two drums for the anchor boom lines. Behind that are the five other drums in line, ladder drum at the center, flanked by the spuds, with the swing gear on the outside at the ends.

For the ladder and spuds a 1⅛-inch wire cable is used; a ¾-inch line is on the booms; while the swing line consists of 450 feet of 1¼-inch wire. On this swing line the No. 3 can take a box cut 150 to 200 feet in width. In Shipyard River where the current is negligible, the dredge took advantage of the dead water and worked the maximum 200-foot cut.

In the lever room at the forward end of the top deck, the operator holds the dredge on her course by means of ranges on shore, moves back and forth across the cut on the swing line, and advances on the spuds and anchor lines. A gage board hung from the A-frame shows the depth at which the cutterhead at the end of the ladder is digging. Gages indicate the amount of vacuum on the pump—around 12 inches on the average—and the discharge pressure, which hovers around 120 pounds although the No. 3 will pump up to 180-pound pressure. A Motorola ship-to-shore radiophone keeps the dredge in contact with the contractor's field office on shore.

Discharge Line

At its maximum, the discharge line on this job totaled 8,300 linear feet of pipe. From the stern of the dredge the floating line varied from 600 to 1,500 feet to the east bank of Shipyard River and the grounds of the U. S. Naval Reservation. A 2,000-foot section of shore line crossed the Government property to the west bank of broad Cooper River. From the bank 2-pile crib bents carried the line 1,200 feet out above the 18-foot depth of water until the channel was reached. At this point the line submerged so as not to interfere with navigation. While the channel has a bottom width of 600 feet, its 40-foot depth necessitated long sideslopes so that the submerged line totaled 1,900 feet. On the other side of the channel 200 more feet of cribbing supported the pipeline to the shores of Daniel Island, the spoil area, north of Cooper River bridge. Shore line on the island varied from 1,200 to 1,500 feet.

The floating line was mostly in 100-foot lengths, made by welding two 50-foot sections together, with a few 50-foot lengths scattered in. Mobile Pulley ball joints connected the pipes. Each 100-foot pipe was floated on three steel pontoons, 14 feet long x 6 feet

(*Continued on next page*)

Yours for the Asking

Further information or descriptive literature can be secured from any advertisers in this issue of CONTRACTORS AND ENGINEERS MONTHLY. Just write name of manufacturer and product of interest to you on the extra line provided on the post card facing page 16, fill in your own name and industry connection, mail to us and we'll do the rest.

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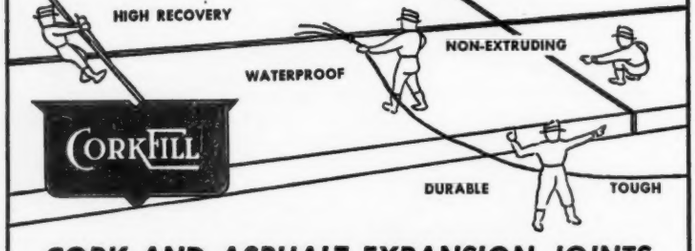

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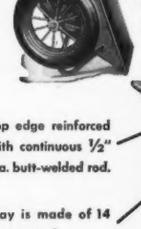

Investigate the unusually sturdy construction of this perfectly balanced cart. It's the best that money can buy. Outlives any other cart. That's why it costs less. Choice of 30" dia. steel wheels or pneumatics. Illustration shows No. 626-PR Cart with dumping rockers and pneumatic tires, 6 cu. ft. capacity, water full. Eight other models. Write for Catalog No. 63.

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A 5809-3fR

wide x 4 feet deep, having a saddle at the center to seat the 22-inch line. A pontoon was located 10 feet back from the end of each pipe, with the third pontoon at the center point. Over the pipe ran a 20-inch catwalk, mostly light steel mesh with pipe railing, with a small amount built of timber.

At the end of the floating line the shore pipe was continued in the 22-inch size for 1,600 feet, then reduced to 16-inch pipe for the rest of the way to the beach. The shore pipe came in 16-foot lengths with telescopic joints. A crew of up to 10 men shifted the pipe about at the spoil area. Working three shifts a day, seven days a week, the No. 3 averaged 125,000 yards of dredged material a week over the long discharge line. A small amount of fill at one time was also placed on the lower end of the Naval Reservation to build up a low place in the terrain.

Labor-Saving Valve

Under the Cooper River the submerged line consisted of 80-foot lengths of 16-inch pipe connected by Mobile Pulley ball joints. When using a submerged line, dredging contractors put a valve in the pipe just before it sinks, and keep operators there all the time to open and close the valve. For when the dredge pump shuts down for any reason, and air instead of hydraulic fill goes through the pipe, then the submerged line will float to the surface causing all kinds of trouble. The operator will open the valve and let the air out of the line before it can enter the submerged pipe.

But such a situation requires three men a day to be in constant attention at a precarious, isolated spot out in the water. Hendry Corp. eliminated the human element in this case by devising an automatic valve that opened whenever the pump shut down and let the air escape. When dredging resumed, the valve closed, letting the water carrying the material continue through the line. The valve was located in the top of the line just before the pipe submerged at the last crib.

First a short section of a segment of pipe was welded to the top of the 16-inch discharge pipe, with its top about 2 inches above the outside of the pipe. Under the welded section, 1-inch slots had been cut in the 16-inch pipe to let water into the chamber that was formed but to keep out trash that might interfere with the valve. From the top of this added piece of pipe, a 7-inch-diameter casing extended vertically to house the valve. The moving part of the device consisted of a weight on top of an arm which held a 5-inch-diameter rubber gasket that bore against a lip around the inside of the casing.

When the discharge line was running at 70-pound or more pressure, the rubber gasket was pressed firmly against the lip and the valve was closed. The weight on top of the moving arm was keyed to the discharge pressure. When the pressure fell below 70 pounds, the arm with the gasket dropped, thus opening the valve. Air and water rushed out through the top of the valve. A hood on top checked the water from gushing straight up in the air. When the pressure rose so did the gasket, thus closing the valve. The only maintenance the valve needed was occasional replacement of the rubber gasket.

Auxiliary Floating Equipment

Auxiliary equipment included a steel derrick barge, 70 x 30 x 4 feet deep, on whose deck was lashed a Koehring crawler crane equipped with a 50-foot boom. The crane picked up the deadman anchor on the bank and moved it ahead when necessary, did general lifting work, and also helped out in the log snagging.

A steel fuel barge, 60 x 28 x 6 feet deep, carried Texas Co. diesel fuel from the docks of Charleston to the dredge. The No. 3 has two fuel-storage tanks at the stern with a total capacity of 15,000 gallons. The fuel barge carried on deck a 3,000-gallon water tank to replenish the two water tanks on the dredge holding 5,000 gallons. Rounding out the floating craft was the tender boat No. 12—38 feet long with a 9-foot beam, and powered by a Cummins 210-hp diesel engine.

Repairs on the dredge were carried out in the blacksmith and welding shop at the stern of the No. 3. Major maintenance equipment included two G-E 500-amp welding machines. Fleetweld No. 5 and No. 7, and Shieldarc No. 85 rods are used for most of the welding. Hard-surfacing on the inside of the pump is done with Abrasoweld.

Personnel

Key personnel on the Hendry Corp.

(*Concluded on next page*)

C. & E. M. Photo

A Koehring crane on a derrick barge picked up the No. 3's deadman anchor on the bank and moved it ahead when necessary.

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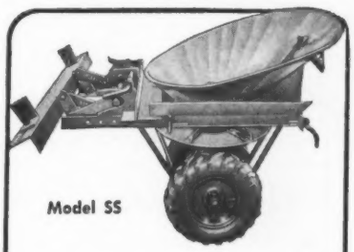

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STREATOR ILLINOIS

Department 700

Harbor Is Improved At Charleston, S. C.

(Continued from preceding page)

dredging contract included I. W. Haile, Superintendent; Vernon H. Thomas, Captain; James A. Powers, Chief Engineer of the No. 3; and S. T. Greene, Office Manager.

For the Department of the Army, Corps of Engineers, Price J. Padgett was Inspector. The Charleston District is headed by Col. Chester L. Landaker, District Engineer.

Charleston harbor is active this year with other dredging work in addition to the Hendry Corp. operations. Maintenance dredging has been completed in the Ashley River to restore safe navigable dimensions. The contract was held by the Merritt Dredging Co. of Charleston. Other contracts will also be awarded for similar maintenance dredging in the Town Creek and Cooper River channels of Charleston harbor. This work is expected to be completed by the end of the year.

Data on Tractor-Shovels

A comprehensive 12-page catalog on tractor-shovels has been prepared by The Frank G. Hough Co., 822 Seventh St., Libertyville, Ill. It includes on-the-job photos showing Payloader tractor-shovels engaged in a wide variety of earth-moving, material-handling, lifting, and carrying work. The catalog contains helpful job data, and lists specifications and features of the complete Payloader line. It also illustrates accessories such as backfiller blades, crane hooks, snowplows, and fork lifts.

This literature may be obtained from the company by requesting Catalog No. 217, or by using the Request Card at page 16. Circle No. 884.

Euclid St. Clair Plant

The fourth in a series of expansions was completed last July by The Euclid Road Machinery Co. Four bays were added to its plant at the corner of 222nd Street and St. Clair Avenue, Cleveland, to house the structural, machine-shop, maintenance, and special-assembly departments. The addition increased the plant area to over 250,000 square feet.

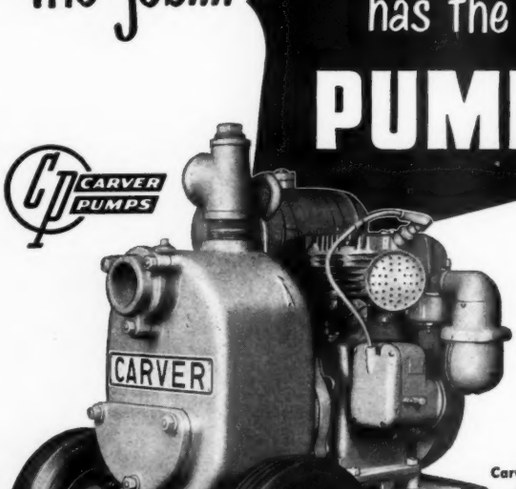
Euclid's most recent model is the 50-ton rear-dump, which is powered by two 300-hp diesels, each driving one of the two rear axles through separate torque converters and hydraulically actuated transmissions. The largest load-on-back unit ever built, the 50-ton rear-dump measures 11 feet 9 inches high, with an over-all width of nearly 14 feet and length of 36½ feet. It has a 100,000-pound payload capacity.

For those whose attention is focused on construction equipment—here is a 50-ton rear-dump "Euc". Powered by two 300-hp diesels, it is 11 feet 9 inches high x nearly 14 feet wide x 36½ feet long, and has a 100,000-pound payload capacity.

Fifty distributors in the United States and Canada sell and service Euclid equipment, while 60 export distributors throughout the world cover 72 countries. Sales and service branches are maintained at Dallas, Texas; Hibbing, Minn.; and Emeryville and Monrovia, Calif. Included in the many construction projects which Euclids have helped build are the Pennsylvania Turnpike and Grand Coulee Dam at home, while their work abroad covers the building of dams, airports, and roads, and the development of coal, metal, and other natural resources. About 20 per cent of Euclid's production is for export.

You name the job.... CARVER has the PUMP

CARVER PUMPS



Carver Self-Priming Pump available in sizes from 4,000 to 240,000 GPH. Also Diaphragm Pumps up to 6,000 GPH. Ask for Bulletin No. 110 Carver Pump Co., Muscatine, Iowa.

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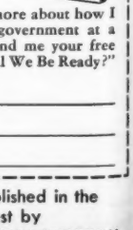

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This is the Thor No. 521 pneumatic vibrator. Its features include a roll-type throttle providing up to 8,000 vibrations a minute.

Concrete Vibrator

A pneumatic concrete vibrator has been announced by Independent Pneumatic Tool Co., 175 N. State St., Aurora, Ill. The Thor No. 521 vibrator consists of a 2¾-inch-diameter steel cylinder, 17½ inches long, at the end of a 5-foot length of combination air and exhaust hose. A ball-bearing rotary air motor and vibrator unit are sealed in the steel cylinder. Optional lengths of 10, 15, and 20-foot combination air and exhaust hose are available; or a 15-foot length of ¾-inch extension air hose may be secured for use with the standard 5-foot length of combination air and exhaust hose.

The vibrator features an adjustable automatic air-line oiler, a roll-type throttle providing up to 8,000 vibrations per minute, and a steel sleeve around the vibrator unit to eliminate grease loss from the bearings.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 994.

Bulletin on Snowplows

A 16-page bulletin describing a complete line of truck-mounted snowplows is offered by The Baker Mfg. Co., 2573 S. Tenth St. at Stanford, Springfield, Ill. It describes V-type and one-way trip blades for trucks of 1½ to 2 tons, 2½ to 3½ tons, 3½ to 5 tons, and 5 tons and up; and reversible trip blades for 1½ to 2-ton medium-capacity and heavy-duty trucks.

The catalog describes two types of mountings: the underslung type in which the plow attaches to the side channels and axles of the truck; and the front-end push type in which the plow is mounted to the front bumper and front end of the truck frame. Lift and push frames have a hand-operated hydraulic lift pump mounted in the cab. Full and semiflare plates are available to increase height and plowing capacity of blade-type plows. Spring deflectors are made for V-type and one-way plows for increased windshield protection. The catalog includes specifications, dimensions, and illustrations for each model.

This literature may be obtained from the company by requesting Bulletin No. 1003, or by using the Request Card at page 16. Circle No. 867.

Steel Shelving Offered

Steel shelving, blueprint cabinets, and parts bins are featured in a brochure prepared by Precision Equipment Co., 3708 N. Milwaukee Ave., Chicago 41, Ill. The shelving is designed to meet a variety of needs and can be connected without special tools. Also featured are Rotabins, space-saving rotating tools or parts bins available in many sizes and styles. The brochure describes and illustrates each product.

This literature may be obtained from the company, or by using the Request

Alaska Needs Contractors

The Corps of Engineers, U.S. Army, hopes to enlist some new contract bids on construction projects it is planning in Alaska. Gil Pearson, Technical Information Officer at the Alaska District Engineer's Office in Anchorage, announced in September that proposed construction plans for the 1952-53 season were sufficiently broad in scope to interest most types of contractors throughout the United States. Construction problems peculiar to Alaska by reason of its climate, Mr. Pearson said, have been largely solved during the past four years of the current building program, and many facilities are now available to contractors on the Alaskan Corps of Engineers projects. The 1952-53 "Prospectus of Construction" gives details.

The Technical Information Office is busy trying to reach prospective bidders by disseminating useful information on Alaskan construction. This is achieved through the media of press and radio in Alaska, four Seattle newspapers, the United Press, the Associated Press, and 63 contractor and engineer stateside magazines. Locally, latest Alaskan Corps of Engineers news is featured each weekday morning at 7:25 over Anchorage radio station KENI. To obtain his copy, Mr. Pearson makes field trips through most of the construction projects in the Territory. On a recent trip he was accompanied by Douglas MacRae, field photo-writer, who remarked afterwards that "completing a contract in Alaska is no more of a trick than it is in the States".

The Corps is seeking additional contractors to bid on 1952-53 projects of the biggest construction program in Alaska. Requests for plans and specifications and bid forms should be forwarded to either the Seattle or Anchorage Office, Alaska District Engineer.

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You may expect exceedingly low repair parts cost and top service.

Wherever your job may be, you will find a Madsen plant will fill the bill in every way.

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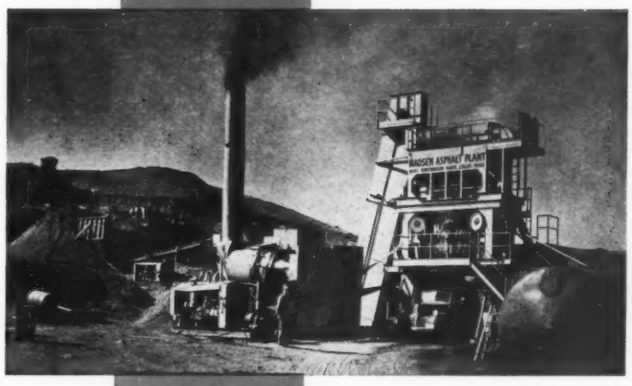
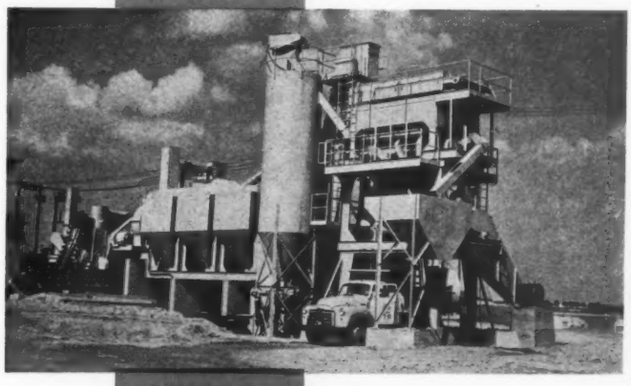


Above: Madsen installation at Raton, New Mexico

Below: Madsen installation at Cranbury, New Jersey



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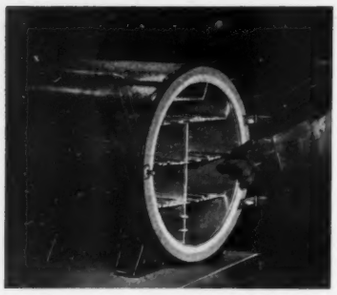

The DryRod oven provides control over the moisture content and temperature of electrodes at their point of use.

New Portable Oven Heats Welding Rods

A portable heated storage unit has been developed to provide control over the moisture content and temperature of electrodes at their point of use and to make possible a system of orderly electrode control whereby better-quality welds may be had. Philip Roden Co., 1721 E. Lake Bluff Blvd., Milwaukee 11, Wis., makes it.

The DryRod electrode oven will control moisture to within 0.2 per cent, the normal accepted U. S. Government standard for moisture content, the company says. It is a cylindrical, compartmented, sheet-metal unit heated by an 840-watt element operating off 110 or 220-volt circuits. It is fully insulated and has a low heat loss. The variable thermostat gives close control on temperatures up to 600 degrees F. Dimensions are 22 inches outside diameter x 25½ inches long. It will hold 350 pounds of electrodes up to 18 inches in length.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 930.

Protective Coating For Masonry or Steel

A protective coating that can be brushed or sprayed on any surface has been developed by Flash-Stone Co., Inc., 30 E. Rittenhouse St., Philadelphia 44, Pa. Tarloc is recommended by the company as a protective coating for concrete structures, masonry, metals exposed to corrosive elements, mastic floors or other blacktop surfaces, wooden platforms, and other general protective purposes. The product is basically a coal tar pitch broken down into minute molecules, then combined with water and a stabilizing emulsification agent to form a permanent suspension.

This new coating is said to retain all the protective and adhesive qualities of coal tar pitch, and to be impervious to oils, greases, other petroleum derivatives, acids, alkalis, water, and condensation. It will not crack at low temperatures or run at high temperatures. It is good from minus 56 degrees to plus 200 degrees F, the company says. It dries to a tough, flat, black film and covers up to 300 square feet per gallon. It comes in 5-gallon pails.

Further information may be secured from the company. Or use the Request Card at page 16. Circle No. 949.

Soil-Mechanics Text Related to Practice

Engineers in all phases of the construction industry should find interest in the new text "Soil Mechanics, Foundations, and Earth Structures", authored by Gregory P. Tschebotarioff, Professor of Civil Engineering, Princeton University. Throughout the book, design and theoretical principles are directly related to applied engineering. The chapter contents are indicative of this slant: spread foundations, excavations, pile and caisson foundations, underpinning, earth retaining structures, tunnels and conduits, dam construction, machinery foundations, and engineering aspects of highway and airport construction.

The text contains more than 400 illustrations, 450 references, and many step-by-step solutions to problems. It covers recent advances in estimating the shearing strength of soil, lateral pressures, the effect of plastic flow, soil behavior under vibratory and slow repetitional loading, and special tests for field exploration. It emphasizes experimental data and field observation, and is illustrated with examples of both successful and unsuccessful structures.

This book is published by the McGraw-Hill Book Co., 330 W. 42nd St., New York 18, N. Y. It costs $6.50.

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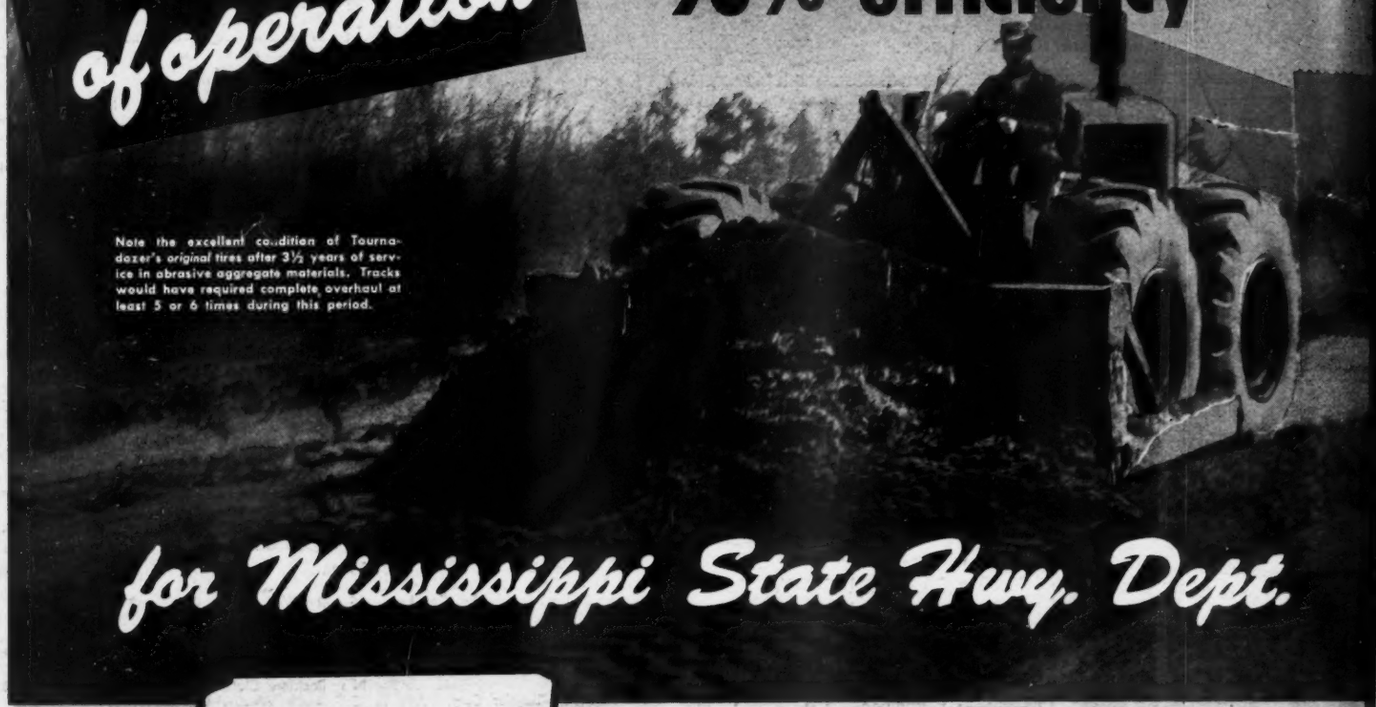

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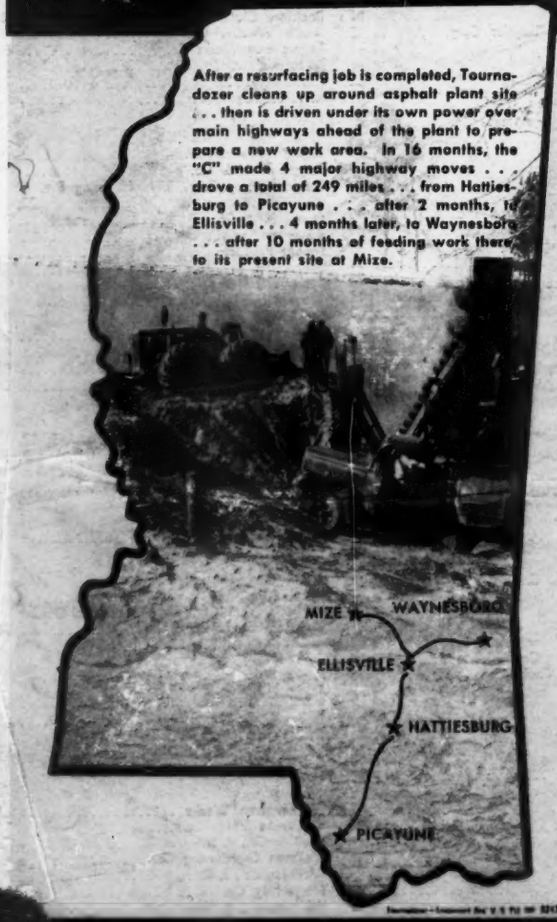

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